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ANTIBIOTIC-RESISTANT STAPHYLOCOCCAL DISEASE: AN OBSTETRIC, SURGICAL, PAEDIATRIC AND HOSPITAL ADMINISTRATIVE PROBLEM

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Within recent years staphylococcal disease is being reported more and more frequently, and our American and British colleagues are worried by the high incidence of staphylococcal sepsis in hospitals.

The American Medical Association convened a conference of experts at Cleveland on 14 November 1957, and the essentials of the conference have now been published.[1,2] The experts remarked on the widespread dissemination throughout the hospitals of the United States and Canada of highly virulent, readily communicable, antibiotic-resistant strains of *Staphylococcus aureus* with a tendency to produce nasal carriers, skin lesions, wound sepsis, soft-tissue infections, and pneumonia. Neonatal infections and breast abscesses among nursing mothers were specially noted as troublesome to the sufferers and likely sources of spread of dangerous staphylococci to the general population.

The Lancet,[3] in May 1958, asked these pertinent questions: How many hospitals in Great Britain are confident about the efficacy and safety of their sterilizing and laundry procedure? How many provide clean air, or even abstain from doing operations and wound dressings in air that is richly charged with pyogenic bacteria? How many hospitals have effective procedures for checking whether members of staff with septic lesions on their persons are going about their duties and operating on, or otherwise attending to patients whose tissues may have a lowered capacity to resist infection? In how many hospitals are junior medical staff or even nursing staff left to prescribe whatever antibiotics they happen to think might be useful? *

In practice we regularly transgress in all these aspects of hospital routine. Laundries contaminate articles that were formerly free of pathogens. Hospital air is sucked from anywhere to anywhere else.

Fluffy woollen blankets provide warmth scarcely needed in centrally heated hospitals; they cannot be sterilized or even very often washed without ruining them, and they fill the air with bacteria-laden dust.

Staphylococcal disease is being more frequently reported in obstetric and paediatric wards,[6-12] causing infantile pyodermia, staphylococcal peritonitis in the newborn, umbilical infection, bullous impetigo and puerperal mastitis. Antibiotic-resistant staphylococcal outbreaks in medical and surgical wards are also being reported.[13]

* An Editorial[4] in the *South African Medical Journal* of 24 May 1958, based on an article by Laurie[5] in the same issue, also dealt with the dangers of hospital infection and problems it presented.

SOURCES AND MODES OF SPREAD OF STAPHYLOCOCCAL INFECTION

Because of the presence in Grey's Hospital of a number of cases of wound sepsis, an investigation was conducted, commencing in September 1957, to determine the incidence of staphylococcal infection in the medical, surgical and obstetric departments.

Technique

Staphylococci for investigation were isolated in the routine laboratory on blood-agar plates, and all coagulase-positive strains were kept for further investigation.

Blood-agar plates were used for isolating staphylococci from nasal swabs and the bedding, curtains and air of the wards and theatres. Samples from bedding were taken by the sweep technique of Blowers and Wallace.[14] All coagulase-positive strains isolated in this way were tested for sensitivity to penicillin, streptomycin, tetracyclines, chloramphenicol and erythomycin by the disc method. The concentrations of antibiotics used were: Penicillin and streptomycin 10 units per disc; chloromycetin 20 μg. per disc; aureomycin, terramycin and achromycin 25 μg. per disc; erythromycin 10 μg. per disc. The Oxford staphylococcus was used as a control, and a control sensitivity test was done throughout the investigation.

The air in the theatre suite and wards was sampled by a slit sampler,[15] the intake being about 2½ feet above floor level. No fans were used to drive the air from the patient to the sampler. The sampler plates were usually rotated at 1 revolution in approximately 2 minutes.

Tables I-IV give an idea of the high bacterial air count in the theatre suite and surgical wards. A strain of *Staph. aureus*, resistant to all antibiotics except chloromycetin and erythromycin was present in one of the male surgical wards.

TABLE I. AIR COUNT: THEATRE SUITE (Fig. 1), 28 SEPTEMBER 1957

Room	*Air count per cu. ft.*	*Notes*
1. Linen room	153	1 colony haemolytic streptococci
2. Theatre 2 (fan working)	286	2 colonies haemolytic streptococci
3. Sterilizing room (2)	154	No pathogens
4. Plaster room	98	No pathogens
5. Theatre 3	67	No pathogens
6. Sterilizing room (3/4)	74	No pathogens
7. Scrub-up room	62	No pathogens
8. Theatre 4	65	No pathogens
9. Theatre 4	53	No pathogens
10. Theatre 4	60	No pathogens

TABLE II. AIR COUNT: OBSTETRIC AND PAEDIATRIC WARDS, 3 OCTOBER 1957

Ward	*Air count per cu. ft.*	*Notes*
J. Ward (main ward)	143	*B. proteus* present
J. Ward (room no. 8) (both paediatric)	76	No haemolytic streptococci or staphylococci
Labour room (European maternity ward)	15	No haemolytic streptococci or staphylococci

TABLE III. AIR COUNT: SURGICAL WARDS, 3 OCTOBER 1957

Ward	*Air count per cu. ft.*	*Notes*
D. Ward (A side)	178	2 colonies of haemolytic streptococci per 4 cu. ft.
D. Ward (B side)	156	3 colonies of haemolytic streptococci per 4 cu. ft.
B. Ward ('dirty' surgical)	196	2 colonies of haemolytic streptococci per cu. ft.
B. Ward ('clean' surgical)	115	No haemolytic streptococci

TABLE IV. SENSITIVITY TO ANTIBIOTICS OF STRAINS ISOLATED FROM AIR SAMPLES IN SURGICAL WARDS, 28 OCTOBER 1957

Antibiotic	*Haemolytic Streptococcus D Ward*	*Haemolytic Streptococcus B Ward*	*Staphylococcus aureus coagulase-positive; B Ward*
Penicillin	Sensitive	Sensitive	Resistant
Aureomycin	Resistant	Resistant	Resistant
Chloromycetin	Sensitive	Sensitive	Sensitive
Streptomycin	Sensitive	Sensitive	Resistant
Terramycin	Resistant	Resistant	Resistant
Erythromycin	Sensitive	Sensitive	Sensitive
Achromycin	Resistant	Resistant	—

THEATRE SUITE

The conditions in the theatres were particularly bad, and it was decided to attempt to improve conditions in the theatre suite as a matter of urgency. In the plan of the theatre suite (Fig. 1) it can be seen that a passage bisects the suite, this passage being the main highway between the hospital entrance and the surgical wards. The general condition of the theatre suite was bad. The floors were unsound; the passages were covered with 'battleship' linoleum, which allowed dust and dirt to accumulate underneath and along the edges of the linoleum. Some of the ceilings were old, the paint was chipping away, and dust in the ceiling was seeping through into the theatres. The air conditioning was unsatisfactory and required complete revision and overhaul to ensure balanced conditions.

Immediate steps were taken to improve matters by replacing the doors in the main passage way (A and B) and closing this passage to all traffic. An antiseptic (germotol) was used to spray the theatres, and air counts on 15 October 1957 (Table V) showed that the count had been reduced tenfold.

TABLE V. AIR COUNT: THEATRE SUITE, 15 AND 16 OCTOBER 1957

Place of Sampling	*Air count per cu. ft.*
Theatre 4, near door to scrub-up	8·3
Theatre 4, near door to sterlizing room	10
Theatre 4, near main doors	18
Theatre 4, by windows	9·2
Theatre 4, by operating table	10·2
Theatre 4, near wall	5·5
Average count for theatre 4	10·2
Corridor outside Theatre 4	31
Corridor near plaster room	39
Tea room (10.30 a.m., just after use)	35
Theatre 3 immediately before 10 a.m. operation	26

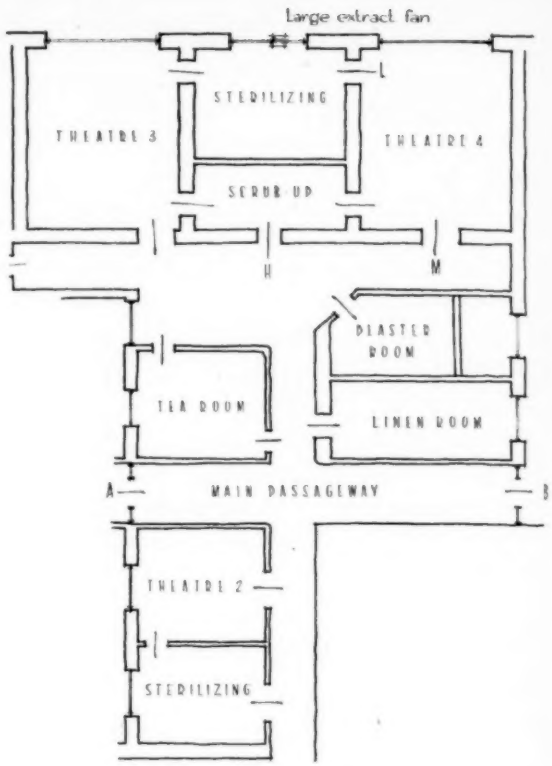

Fig. 1. Theatre suite.

Comments. Theatre 4 was sampled under ideal conditions. The theatre was sealed off and the technician wore gown, cap and mask. The theatre had been sprayed about 30 minutes before the first sample was taken. The negative pressure in the theatre (see below) was responsible for a great deal of the pollution. This theatre is used for burns and major surgery, and therefore falls far short of the standard (a maximum of 2 organisms per cubic foot).

HOSPITAL BLANKETS

In September 1958 sweep sampling[14] was performed on hospital blankets (Table VI), which showed a very high reservoir of infection in all the wards. Twenty strokes over the surface of the blanket produced a heavily contaminated plate. Ten strokes were tried, and on an average

TABLE VI. RESULTS OF STROKE SAMPLING OF BLANKETS

Blanket	*Viable organisms per plate*
1. On trolley in main operating theatre	470 (approx.)
2. Covering patient waiting to enter operating theatre	180
3. Stretcher blanket of theatre 2	900 (approx.)
4. On bed in B ward	250
5. In store of A ward	250
6. Outside delivery room of M2 ward	560 (approx.)

produced plates with colonies sufficiently differentiated to make counting and investigation of the organisms a possibility. Five circular motions with a radius of about 8 inches produced a more evenly seeded plate, and this method was used to obtain the samples referred to in Table VI.

Pathogenicity of Organisms Isolated from Blankets

1. Several colonies from each plate were investigated and antibiotic sensitivity tests were carried out on pathogenic organisms. The majority of the organisms belonged to the group associated with normal air pollution, viz. *Staph. saprophyticus*, sarcinae, coliforms, *Neisseria catarrhalis*, etc., but the following pathogenic organisms were isolated:

(*a*) A growth of *Staph. pyogenes* was isolated from sample 1 (Table VI) and was found to be sensitive to all the antibiotics listed in Table IV.

(*b*) A growth of *Staph. pyogenes* was isolated from sample 5 and was found to be resistant to aureomycin, terramycin, and achromycin, moderately sensitive to penicillin, and sensitive to chloromycetin, streptomycin and erythromycin.

(*c*) A growth of *B. proteus* was isolated from a bed in B ward (sample 4) and was found to be resistant to all the antibiotics in the list.

2. Anaerobic samples were taken from blankets in the operating theatre. No anaerobic organisms were isolated from them.

3. Twelve samples on agar containing crystal violet (for haemolytic streptococci) were taken in F ward. One colony of B haemolytic streptococci were isolated and several of A haemolytic streptococci.

The ease with which *Staph. pyogenes* and other pathogens could be obtained from hospital blankets indicated the danger of blankets as a source of infection in the wards, labour rooms, and theatre suites.

Sterilization of Blankets

Examinations were conducted to determine whether sunlight was a good bacteriocidal agent. Sweep plates before and after 8 hours' exposure to sunlight showed no reduction in the bacterial count. Formaldehyde vapour was also tried. Blankets suspended in formaldehyde vapour* for 2 hours showed very little reduction in the bacterial count, but after exposure in the vapour for about 24 hours there was a marked reduction in the bacterial count.

It was therefore decided to change the woollen blankets in the surgical and orthopaedic wards every 2 weeks and formalize them before returning them to the ward. It was also decided to launder the blankets more often, and in laundering to wash them in cirrasol.[14]

In addition to these precautions it was decided to remove ward blankets from patients' trolleys before entering the theatre, and to replace them with sterile cotton blankets (sterilized with pressure steam). Because of the danger that woollen garments may harbour pathogenic organisms, medical practitioners were requested to change from their day clothes into a cotton singlet and trousers and to wear a clean cap, mask and boots, before entering the operating theatres.

* In a closed room 13×14×10 ft. (=1,820 cu. ft.) 3 oz. of potassium permanganate is added to 8 oz. of formalin (40%) in a large vessel.

Theatre Suite

It was decided to repeat the slit sampling of the air in theatre 4 now that only sterile cotton blankets were allowed into the theatre. Four counts made in October 1958 gave 3, 4, 6 and 16 organisms per cu. ft. respectively.

As sterilizing in the theatre was done by the boiling-water method, a large extraction fan was used to remove the air from the sterilizing room (Fig. 1). This resulted in a strong flow of air into theatre 4 by door M and out by door L. It was decided to close the louvre in door L, and make new openings which diverted the air flow from the passage through the scrub-up room and sterilizing room. Three air counts in theatre 4 made after this alteration gave 1·5, 2·0 and 3·5 organisms per cu. ft. respectively —almost normal.

DEATHS OF PREMATURE INFANTS

On about 1 October 1958, 5 premature infants, nursed in incubators, succumbed in the non-European maternity ward. Of these deaths 2 were due to prematurity, but 3 of the infants died on or about the 10th day with a blood-stained discharge from vagina, rectum and mouth. Air samples were taken from the incubators concerned, and from stools of the infants that had died, and sweep samples from clean napkins in the maternity ward. Staphylococci, coagulase positive, sensitive only to erythromycin, were isolated from the clean napkins, the interior of the incubators, and a stool from one of the infants that had died.

Viral studies on tissue sent to the S.A. Institute for Medical Research from one of the infants that had succumbed proved negative for the Coxsackie virus.

Phage-typing of one of the staphylococcus cultures from a premature infant that died gave a pattern of phage-type 80. A midwife who attended these premature infants developed an acute staphylococcal infection of the right hand, necessitating her confinement to the ward. Typing of one of the cultures from her hand gave phage-type 80. It is evident, therefore, that these infants died from an acute staphylococcal phage-type-80 infection. This organism was resistant to all the common antibiotics except erythromycin.

The phage-type-80 staphylococcus has been identified in Europe since 1955, and has been observed in various parts of the world, including the USA. It has been the cause of all serious infections in wards and outbreaks in hospitals.

In view of the presence of this virulent strain of staphylococcus, the following measures were taken:

1. The nursery and premature nursery were closed to further admissions.

2. Newborn infants born after the day the nurseries were closed were transferred to a vacant floor above, with their mothers.

3. As soon as this had been effected (about 10 days), brick partitions in the general maternity ward were removed. The ward was repainted and redecorated, and the number of beds reduced from 20 to 14.

4. The nurseries were fumigated with formalin, and the incubators were well scrubbed out and washed with germatol. Repeated cultures from the incubators proved that they were extremely difficult to sterilize, and further examination showed that the best way to sterilize them was to leave them in formalin vapour for 24 hours.

5. Only autoclaved linen was used in the incubators.

6. Nursing staff were instructed to wash their hands with hexachlorophene before each baby bath.

7. Only sterile cotton blankets were used in the labour rooms.

8. 'Savlon' was used to wet-sweep the floors and walls of the labour room.

9. Nose, throat and vaginal swabs were taken of all new patients for a month, to decide if the mothers were carriers of the staphylococcus. This investigation showed that they were not, and that the staphylococcus was endemic in the ward.

ANALYSIS OF HOSPITAL STAPHYLOCOCCAL INFECTION

An analysis of the occurrence of hospital staphylococcal infection over the 7 months period from 15 June 1958 into January 1959 was made at the end of December 1958. The total number of cases during this period was about 54, as follows:

June	3	October	7
July	2	November	13
August	2	December	19
September	4	January	4

The staphylococcus isolated from various departments of the hospital and from patients suffering from staphylococcal infections had a definite pattern of sensitivity; it was resistant to penicillin, aureomycin, streptomycin, terramycin, and achromycin, and sensitive to chloromycetin and erythromycin.

Because of the increasing number of staphylococcal infections, it was decided to isolate patients and nursing staff suffering from staphylococcal disease showing this pattern of resistance to antibiotics. A ward, M.1, was accordingly opened in November 1958 where these cases were isolated and treated.

RESULTS OF ROUTINE STERILIZING OF BLANKETS AND WET DUSTING WITH 'SAVLON'

Table VII shows the results of slit sampling of the air in the surgical wards after routine sterilizing of blankets and wet dusting with 'savlon' had been instituted, as compared with the results obtained on 3 October 1957 (Table III).

TABLE VII. AIR COUNT : SURGICAL WARDS

Ward	*Date of silt Sampling*	*Organisms per cu. ft.*
D Ward (A side)	3 October 1957	178
	9 January 1959	9
B Ward ('dirty' side) ..	3 October 1957	196
	31 December 1958	14*
B. Ward ('clean' side) ..	3 October 1957	115
	31 December 1958	12

* Four samples were taken at different times in the day; 40 cu. ft. of air at each sample yielded an average count of 14 viable organisms per cu. ft. One colony of haemolytic streptococcus was isolated.

Further Observations in B Ward, 17 December 1958

Brooms. Springing the broom hairs on to the plate yielded a heavy growth of viable organisms. No pathogens were isolated.

Curtains. Ten sweeps yielded a growth of 6 viable organisms per plate. No pathogens were isolated.

Blankets. Ten sweeps per blanket yielded an average of 15 viable organisms per plate. No pathogens were isolated.

DISCUSSION

This investigation into the cause of wound sepsis brought to light the alarming fact that the air in the theatre suite was highly contaminated by airborne organisms, some of which were pathogenic. This high airborne count was probably the direct cause of wound sepsis. For many years it has been generally believed that the chief cause of fresh infection of wounds in operating theatres is direct contact with some infected solid or liquid matter. While this was certainly true when somewhat imperfect aseptic techniques were employed, the continual improvement which is being made in the cleanliness of instruments and other objects in contact with wounds must in time reach a point at which the number of fresh infections from dirty air becomes an appreciable fraction of all such infections. When that point is reached, attention to the cleanliness of theatre air becomes important.

The air-counts in the surgical wards were also extremely high, and a staphylococcus was present which was endemic in all departments, showing a characteristic pattern of resistance to the antibiotics in general use.

Sweep plates of blankets, ward curtains and linen revealed a reservoir of infection which proved difficult to eradicate. The endemic strain of staphylococcus was present in the incubators, linen and blankets of the midwifery wards, where it led to the death of 3 premature infants before the infection was traced to its source and dealt with. These fatalities from staphylococcal disease in infants nursed in incubators indicate the danger from incubators which are not sterile. Incubators afford favourable conditions for the growth of pathogenic organisms, and unless scrupulous care is taken to sterilize them before use, and to use only autoclaved linen in them, there is a danger of infection occurring in the infants.

Preventive Measures

Theatre suite. By closing the theatre suite to unnecessary traffic, altering the flow of air through the theatres, and not allowing contaminated woollen material such as blankets and doctor's clothes into the theatre, the air count was reduced to normal.

Surgical wards. By fumigating blankets by suspending them in formaldehyde gas for 24 hours, and the wet dusting of wards, the air count in the wards was reduced to normal.

Maternity section. Staphylococcal disease in premature infants was aborted by fumigating the incubators by exposing them to formaldehyde gas for 24 hours, autoclaving the linen used in the incubators, and insisting on a hand-washing routine with hexachlorophene soap.

Other measures taken were to use sterile cotton blankets in the labour rooms, and to wet-dust with dusters wrung out in 'savlon'.

SUMMARY

Staphylococcal disease in Grey's Hospital was studied for 15 months.

Air counts in the theatre suits and surgical wards revealed high bacterial counts with pathogenic organisms, resistant to many antibiotics.

The air count in the theatre suite was reduced to normal by:

(1) altering the air flow through the theatre;

(2) allowing only sterilized cotton blankets to be introduced into the theatre; and

(3) insisting on surgeons changing into cotton singlet and trousers and wearing caps, masks, boots and gowns.

Air counts in the wards were reduced to normal by sterilizing blankets and wet-dusting.

An outbreak of staphylococcal disease, phage-type 80, in premature infants nursed in incubators was aborted by using only autoclaved linen in the incubators and sterilizing the incubators.

I am grateful to Mr. A. S. Hewstone, senior technician, for his invaluable help with the laboratory investigations; to the visiting medical staff and the matrons and nursing staff for their help and cooperation; and to Dr. J. L. Parker, Director of Medical Services, Natal, for permission to publish this article.

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A SIMPLE METHOD FOR THE COLLECTION OF URINE FROM FEMALE INFANTS

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The collection of urine from female infants without resort to catheterization can be a tedious and difficult procedure. The following method is easy to use, does not require elaborate apparatus, and can be carried out easily in the home, surgery, or out-patient department.

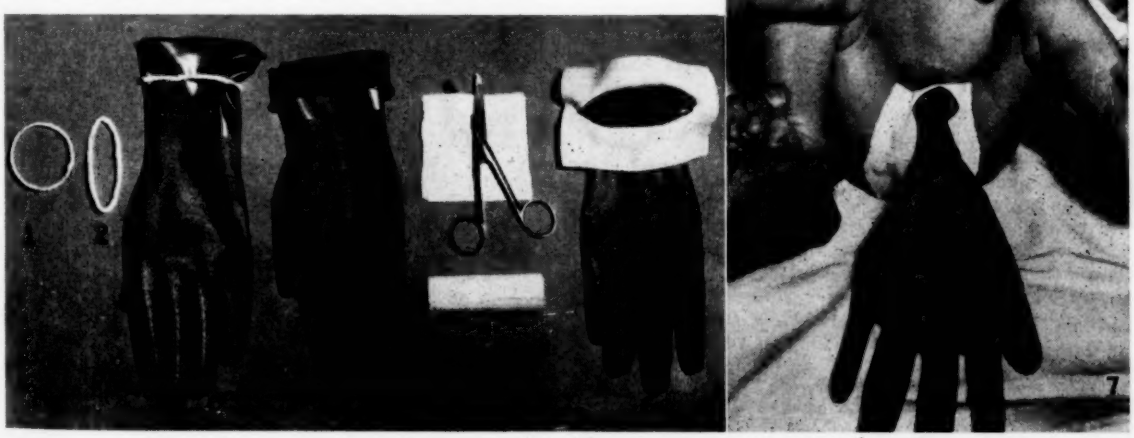
Materials. The necessary materials consist of a size-6½ surgical rubber glove, several pipe cleaners, and a roll of 3-inch-wide elastoplast or waterproof strapping.

Method. Two pipe cleaners are twisted together to form a ring 2 inches in diameter (Fig. 1). The ring is flattened from side to side (Fig. 2), and the sleeve of the glove pushed through it for about 1½ inches (Fig. 3). The free edge of the glove is then turned down over the ring to form a cuff 1 inch wide (Fig. 4).

A strip of elastoplast 3½ inches in length is now cut from a roll, and a slit 2 inches long made in it in a vertical direction (Fig. 5). An assistant then holds the elastoplast with the sticky surface uppermost, and the rim of the glove is gently pushed upwards through the slit in the elastoplast until it just projects above the surface (Fig. 6). Gentle pressure on the underside will ensure that the glove is snugly attached to the elastoplast around its periphery.

The glove is now ready to be applied. The infant's thighs are separated and the elastoplast attached just beyond the vulva (Fig. 7), adapting the shape of the rim by simply bending the wire. The infant is lifted up, sat on the mother's or nurse's lap, and given a feed or clear fluids. When it is observed that the infant has passed urine into the glove (usually after about 10 minutes), it is carefully removed, and the urine poured into a collecting glass.

Summary. A simple method for the collection of urine from female infants is described. The materials required are readily available, and the procedure can be carried out as easily in the patient's home or the doctor's surgery as in the clinic or out-patient department.



Figs. 1-7.

INTERNATIONAL COLLEGE OF SURGEONS, NORTH AMERICAN FEDERATION

The 24th Annual Congress of the North American Federation of the International College of Surgeons will be held in the Palmer House, Chicago, USA, on 13–17 September 1959. Surgical specialities to be represented are: coloproctologic, neurologic, obstetric and gynaecologic, ophthalmologic, otorhinolaryngologic, orthopaedic, plastic and reconstruction, trauma and rehabilitation, and urologic. There will also be surgical motion pictures, reports on advances in military medicine, and a surgical nurses' programme. This Congress, which will be held in honour of the Chicago Medical Society and in memory of John B. Murphy, Christian Fenger, and Nicholas Senn, Chicago pioneers in surgery, will also be attended by distinguished representatives of the International College from other countries. Surgeons desiring to present papers should write to Dr. Peter A. Rosi, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, USA.

Suid-Afrikaanse Tydskrif vir Geneeskunde : South African Medical Journal

VAN DIE REDAKSIE : EDITORIAL

HIPOTERMIE EN EKSTRAKORPOREALE SIRKULASIE BY OOPHART-CHIRURGIE

Operasies binne die oop hart word uitgevoer met behulp van òf algemene liggaamsverkoeling en stilstand van die sirkulasie, òf ekstrakorporeale sirkulasie met 'n meganiese pomp en oksigenator. Van hierdie twee metodes was laasgenoemde eerste in die veld, maar kort na 1950, toe Bigelow in Kanada en Boerema in Holland algemene liggaamsverkoeling vir die doel aangewend het, het hierdie metode in die kliniese toepassing veld gewen en tydelik die meganiese kunsmatige hartlong verbygesteek. 'n Paar jaar lank was daar 'n nie-amptelike wedren tussen die ‚pompers' en die ‚verkoelers', waarin nou die een dan die ander 'n voorsprong geniet het. Op die oomblik het die ‚pompers' hulle, tweede wind' gekry en die ‚verkoelers' ver agtergelaat. Sal verkoeling in die toekoms heeltemal in onbruik raak en net van geskiedkundige belang word? Moontlik wel, maar dit is ewe moontlik dat verkoeling weer op die voorgrond sal tree.

Die gebruik van algemene liggaamsverkoeling berus op die verminderde metaboliese eise van die liggaamsweefsels by lae temperature, as gevolg waarvan die weefsels langer as by die normale temperatuur sonder bloedsomloop kan klaarkom. Harsingselle, wat die gevoeligste vir stilstand van die sirkulasie is, kan by 37·5°C omtrent 3 minute stilstand verdra, maar by 28°C omtrent 8-10 minute. Op grond hiervan is 'n tegniek van oophart-chirurgie uitgewerk waarvolgens sekere eenvoudige aangebore afwykings soos atrium septum-defekte van die *secundum*-tipe en aangebore pulmonale klepstenose met goeie resultate herstel kon word. Die voordeel van hierdie tegniek bo die meganiese ekstrakorporeale sirkulasie is dat die benodigde apparaat heelwat eenvoudiger en goedkoper is, en dat daar in 'n heeltemal ‚droë' hart gewerk kan word. Die nadeel, wat oorweldigend is, is die kort tyd wat binne die hart tot die beskikking van die chirurg is, naamlik omtrent 8 tot 10 minute (wat deur afwisselende afsluiting heelwat verleng kan word, maar tog lastig bly). Hierdie kort tyd is alleen vir die genoemde eenvoudige afwykings toereikend. Pogings om die beskikbare tyd te verleng deur lae temperature te gebruik, het tot kort gelede op verskeie moeilikhede, soos die verhoogde gevaar van ventrikulêre fibrillasie en die moontlike gevaar van beskadiging van lewensbelangrike selle (nog 'n betwisbare punt), skipbreuk gely. Omstreeks 28°C is tot onlangs beskou as die redelike veilige laagste temperatuurgrens.

Die ekstrakorporeale sirkulasie, wat van 'n pomp (kunshart) en 'n oksigenator (kunslong) gebruik maak, is in die afgelope 5 jaar tot so 'n mate verbeter en verfyn dat dit nou die groot voordeel bied dat die sirkulasie tot 1½ of selfs 2 uur oorgeneem kan word, wat genoeg tyd toelaat om die meeste intrakardiale operasies te doen wat tans oorweeg word. Die benodigde apparaat is ten spyte van baie vereenvoudiging nog ingewikkeld genoeg om die hulp van 'n tegniese assistent te vereis—en dit bly nog maar duur.

Die tegniek van perfusie het geweldig vooruitgegaan, maar is op sigself nog nie heeltemal vry van gevaar nie. Hierdie ‚sputnik' van die chirurg het dus nog verdere verbetering en vereenvoudiging nodig.

Een van die moontlike rigtings van vordering in die toekoms is die gesamentlike gebruik van die ekstrakorporeale sirkulasie *en* verkoeling. Met die eerste oogopslag lyk so 'n voorstel onbevredigend omdat die nadele van albei metodes saamgevat sou word. Aan die anderkant kan daar teoreties voordele daaraan verbonde wees, byvoorbeeld, die verlenging van die beskikbare operasietyd binne die hart. Ondersoeke na die gesamentlike gebruik van hierdie twee metodes[1,2] dui op die moontlikheid dat daar nie alleen groter voordele nie, maar ook minder nadele as aan elke metode afsonderlik verbonde mag wees, byvoorbeeld: ventrikulêre fibrillasie kom selde voor, vermoedelik omdat die hart se werk grotendeels deur die pomp oorgeneem word. Gollan[3] het hierdie tegniek nog verder gevoer deur diere met behulp van 'n pomp-oksigenator tot temperature na aan vriespunt te verkoel. Van 13 honde wat tot tussen 3 en 8°C verkoel is (op welke temperatuur die hart gewoonlik heeltemal stilstaan) en 'n halfuur lank op hierdie temperatuur gehou is terwyl die linker-atrium oopgemaak en weer gesluit is, het 9 gelewe. Dit lyk dus of die lae temperatuur op sigself nie noodwendig noodlottig is nie. Dit is interessant dat by sulke lae temperature hemoglobien onnodig en trouens byna nutteloos vir die vervoer van suurstof is. Die hoeveelheid suurstof, wat in fisiese oplossing in die plasma gedra word, is vir die verlaagde metabolisme voldoende.

Verdere oorwegings ten gunste van die onskadelikheid van die lae temperatuur as sodanig word in 'n heel onlangse artikel deur Drew *et al.*[4,5] aangebied. Deur van 'n pomp gebruik te maak om die werk van die ventrikels te doen, maar met gebruik van die dier of pasiënt se eie longe vir oksigenasie, het hierdie navorsers diere en pasiënte tot 13 en 15°C afgekoel en toe die sirkulasie tot stilstand gebring—tot so lank as 45 minute. Hoewel verskeie van die eksperimentele diere nie herstel het nie, was daar wel oorlewendes. Van 7 pasiënte was daar 2 sterfgevalle, in wie se gevalle daar redelike alternatiewe verklarings vir die dood was. In die oorlewendes was daar ten spyte van sirkulasiestilstand wat 42 minute geduur het geen harsingskade nie, en ventrikulêre fibrillasie het meesal nie plaasgevind nie.

Daar skyn dus redelike goeie hoop te wees dat verdere navorsing ons in die toekoms sal leer hoe om pasiënte tot heel lae temperature te verkoel en dan weer tot die normale te verwarm sonder om hulle weefsels te beskadig. Dit lyk waarskynlik dat by hierdie heel lae temperature sirkulasie-stilstand wat 'n uur of meer duur, moontlik sal wees. 'n Mens se verbeelding kan jou maklik oorweldig wanneer jy aan die moontlike toepassings van so 'n prosedure dink, bv. meer uitgebreide en deeglike oophart-operasies, 'n wyer veld vir operatiewe eksisie van aneurismas van bv. die aorta-boog; moontlike uitbreiding van neurochirurgiese ingrepe vir vaatryke letsels, veiliger operasies op die lewer en poortaar-

stelsel, en vermindering van chirurgiese skok. Onder hierdie omstandighede sal die chirurg nie meer die patoloog-anatoom hoef te beny vir die stilte en slapte van sy ‚pasiënt' en vir die byna bloedlose veld waarin hy werk nie, want sy eie pasiënt sal gedurende die operasie tydelik ‚dood' wees.

Ons moet die saak egter nugter beskou. Op die oomblik lyk dit baie waarskynlik dat die blote lae temperatuur op sigself nie onherstelbaar skadelik is nie. Indien ons kan leer om lae temperature op die regte manier te gebruik, kan daar in die toekoms belangrike en miskien selfs revolusionêre ontwikkelings in die chirurgie ontstaan. Miskien het die Amerikaner gelyk gehad toe hy by 'n onlangse mediese kongres gesê het: ‚Maybe the cold boys are getting hot again.'

1. Gollan, F., Phillips, R., Grace, J. T. en Jones, R. M. (1955): J. Thorac. Surg., 30, 626.
2. Sealy, W. C., Brown, I. W. Jr. en Young, W. G. (1958): Ann. Surg., 147, 603.
3. Gollan, F., Grace, J. T., Schell, M. W., Tysinger, D. S. en Feaster, L. B. (1955): Surgery, 38, 363.
4. Drew, C. E., Keen, G. en Benazon, D. B. (1959): Lancet, I, 745.
5. Drew, C. E. en Anderson, I. M. (1959): *Ibid.*, I, 748.

HYPOTHERMIA AND EXTRACORPOREAL CIRCULATION IN OPEN-HEART SURGERY

Open-heart surgery is carried out by the use of generalized cooling of the body and cessation of the circulation, or by employing extracorporeal circulation maintained by a mechanical pump and oxygenator. Of these two methods, extracorporeal circulation was employed first. However, shortly after 1950 when Bigelow in Canada and Boerema in Holland introduced hypothermia for this purpose, this method temporarily surpassed the artificial heart-lung machine in the clinical field. For a few years unofficial rivalry existed between the 'pumpers' and the 'coolers' with now the one group and then the other in the lead. At present the 'pumpers' have gained their 'second wind' leaving the 'coolers' far behind. The question arises whether cooling will in future fall into disuse and retain historical significance only. This is possible, but it is equally possible that hypothermia may once more gain ground.

The theory of generalized cooling of the body rests on the diminished metabolic demands of the tissues of the body at low temperatures, which enable these tissues to survive without the circulation. Brain cells, which are extremely sensitive to cessation of the circulation, can tolerate cessation for 3 minutes at 37·5°C, but for 8-10 minutes at 28°C. A technique for open-heart surgery has been evolved on the basis of the findings mentioned making it possible to repair successfully certain uncomplicated congenital conditions such as atrial septal defects of the *secundum* type and congenital pulmonary stenosis of the valves. The advantage of this technique over the mechanical extracorporeal circulation is that the apparatus required is considerably less complicated and expensive, and that it is also possible to operate in a completely 'dry' heart. The overwhelming disadvantage, however, is the brief period of time available to the surgeon for working inside the heart, viz. 8-10 minutes. This period of time can be lengthened by intermittent interruption, but the problem remains formidable. Only the simple defects mentioned above can be adequately treated during this brief period of time. Until recently, attempts to prolong the available time when using low temperatures have failed, because of various difficulties, such as the increased danger of ventricular fibrillation and the possible danger of damaging vital cells (still a controversial point). Until quite recently 28°C was accepted as the lowest relatively safe level.

Extracorporeal circulation, in which a pump (artificial heart) and oxygenator (artificial lung) are employed, has been improved and refined to such a degree during the past 5 years that it can now take over the circulation for 1½ to 2 hours. This leaves enough time for the performance of most intracardial operations which are attempted today. In spite of much simplification, the required apparatus remains, however, complicated enough to necessitate a technical assistant, and the cost of the procedure remains high.

The technique of perfusion has developed rapidly, but is in itself not yet quite free from danger. This surgical 'sputnik', therefore, still requires further improvement and simplification.

One of the possible lines of progress is the combined employment of extracorporeal circulation and hypothermia. At a first glance a suggestion of this nature appears unsatisfactory, because the disadvantages of both methods may *also* be combined. On the other hand, theoretical advantages may result from the combination of the two methods, for instance, the available time for operation inside the heart may be prolonged. Research into the combined use of these two methods points, not only to the possibility of greater advantages, but also to fewer disadvantages than are separately associated with each method.[1,2] Ventricular fibrillation, for instance, occurs infrequently, presumably because the work of the heart is largely taken over by the pump. Gollan[3] carried this technique further by lowering the temperatures of animals almost to freezing point and then making use of a pump oxygenator. Of 13 dogs cooled to between 3 and 8°C (when the heart usually stops) and kept at this temperature for half an hour while the left atrium was opened and closed again, 9 survived. It would appear, therefore, that low temperatures, as such, are not necessarily fatal. It is interesting to note that at very low temperatures haemoglobin is not necessary and may even be useless for the transport of oxygen. The volume of oxygen which is carried in physical solution in the plasma is sufficient for the lowered metabolism.

Further evidence pointing to the harmlessness of low temperatures is presented by Drew *et al.*[4,5] in a recent article. By using a pump to do the work of the ventricles, whilst making use of the lungs of the animal or patient for oxygenation, these investigators lowered the temperatures of the animals and patients to 13 and 15°C and then brought the circulation to a stop for periods of 45 minutes. Although several of the experimental animals died, there were some that survived the experiment. Of 7 patients 2 died, but there were reasonably acceptable alternative explanations for the death. Those patients who survived showed no evidence of brain damage in spite of cessation of the circulation for 42 minutes, and in most cases ventricular fibrillation did not occur.

It would appear, therefore, that it can be expected that in the future research will show us how to lower the temperature of patients to a very marked degree, and then to restore them to normality without causing damage to the tissues.

It is probable that cessation of the circulation for an hour or longer might be effected at low temperatures. Great possibilities arise from a procedure of this nature, e.g. extensive and adequate open-heart operations, a wider field for the excision of aneurysms, possible extension of neurosurgical procedures for vascular lesions, safer operations on the liver and portal system, and diminished surgical shock. Under these circumstances the surgeon need no longer envy the pathologist-anatomist the quietness and relaxation of his 'patient' and the almost bloodless field in which he works, because his own patient will be temporarily 'dead' during the operation.

At present it would appear that low temperatures in themselves need not be irretrievably harmful. If we could learn how to use low temperatures correctly, important, and possibly even revolutionary, developments in surgery might arise. It is possible that the American doctor may have been right when, at a recent medical congress, he said: 'Maybe the cold boys are getting hot again'.

1. Gollan, F., Phillips, R., Grace, J. T. and Jones, R. M. (1955): J. Thorac. Surg., 30, 626.
2. Sealy, W. C., Brown, I. W. Jr. and Young, W. G. (1958): Ann. Surg., 147, 603.
3. Gollan, F., Grace, J. T., Schell, M. W., Tysinger, D. S. and Feaster, L. B. (1955): Surgery, 38, 363.
4. Drew, C. E., Keen, G. and Benazon, D. B. (1959): Lancet, I, 745.
5. Drew, C. E. and Anderson, I. M. (1959): *Ibid.*, I, 748.

ATOMIC MEDICINE

Dr. Charles F. Behrens and his 25 specially chosen contributors set themselves a threefold task during the past decade (the first edition of *Atomic Medicine* appeared in 1949), viz.:

To gather in one volume the answers to numerous problems related to the use of atomic energy, involving nuclear physics, physical chemistry, radiation biology and therapy.

To keep abreast of the rapid advances in all fields of research and development, as well as the advent of thermonuclear weapons with the fantastic increase in the order of magnitude of violence and perils from radiation hazards, in regard to which there is much keener and more disquieting appreciation of large-scale evils to the human race.

To assemble such of this material as is appropriate to the needs of the medical and allied professions, and to present it as clearly as possible, steering a middle course between a presentation suitable only to specialists in the fields of radiation biology and physics and, on the other hand, one unduly elementary.

In this third edition of *Atomic Medicine*[1] the authors have succeeded in a remarkable way in fulfilling the mission they set out to achieve. The book provides authoritative information concerning ionizing radiation, its potential dangers, and its applications in peacetime medical practice, as well as the potential horrors of atomic warfare.

This publication is one that will be of the greatest value to the medical and allied professions and is recommended for inclusion in every library which is accessible to medical practitioners and all others concerned with Civil Defence.

1. Behrens, C.T., ed. (1959): *Atomic Medicine*, 3rd. ed. Baltimore: Williams and Wilkins Co. London: Baillière, Tindall and Cox Ltd.

MASS CHEMOTHERAPY IN BILHARZIA IN NORTHERN TRANSVAAL

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H. P. BOTHA, M.B., CH.B., *Regional Medical Officer, Tzaneen;* H. J. COMBRINK, *Senior Health Inspector, Nylstroom;* and
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Bilharzia is a social disease, the control of which must be approached from a broad angle and with the close co-operation of the medical profession and the lay public. If any measure of control over this disease in the Union of South Africa is to be achieved in our time then it will have to be combated more vigorously; but before this country can embark on a widespread anti-bilharzia campaign, more promising evidence than that recorded here will have to be produced to show that satisfactory results at reasonable cost can be expected.

Surveys so far have clearly indicated that bilharzia occurs in well over 50% of the Bantu children of school-going age in the subtropical parts of the Northern Transvaal. In these areas the disappearance of malaria paved the way for great economic development which favoured the spread of bilharziasis. More intensive cultivation encouraged the introduction of this scourge into new irrigation schemes or increased its intensity in existing irrigated areas. The marked difference in the extent of the areas affected by the disease becomes apparent from a comparison of the papers on the subject by Annecke and Peacock[1] (1951) and Annecke, Pitchford and Jacobs[2] (1955) with the limited number of papers of earlier date. The present distribution of bilharzia in the Union can be seen from Map I, compiled by Dr. R. J.

Map 1. Union of South Africa showing distribution of bilharzia. Scale 1 inch = c. 543 miles. *S. haematobium* found in cross-hatched areas; *S. mansoni* found in stippled areas.

Pitchford, of the CSIR Bilharzia Research Unit at Nelspruit.

Surveys made recently not only showed a very high bilharzia incidence but also unveiled the noteworthy prevalence of other helminth infections (Tables I and II). The

TABLE I. DIAGNOSTIC TESTS FOR BILHARZIA, NORTHERN TRANSVAAL: 1956-57

Area	Urines		Faeces	
	Number tested	Number positive	Number tested	Number positive
West ..	6,251	1,306 (20·9%)	Nil	Nil
Central ..	1,685	242 (14·4%)	Nil	Nil
North ..	7,327	3,592 (49·0%)	2,889	1,517 (52·5%)
East ..	4,944	2,533 (51·2%)	875	448 (51·2%)

excreta in Native territories and rural areas with a backward population of some 1½ million; (4) active steps to avoid the risk of bilharzial infection by the provision of pure or purified water supplies for all household purposes; and (5) apart from the probable high cost of this effort, a prolonged and intensive educational campaign to convince the whole community and obtain their intelligent cooperation in the scheme.

In order to gauge the feasibility of such a scheme the proposed methods have been extensively tested over the past 2 years (1957-58) in specially selected localities. This paper deals with these trials, the results obtained, and the conclusions arrived at so far.

TABLE I. PREVALENCE OF HELMINTHS IN NATIVE SCHOOLCHILDREN: LETABA DISTRICT, 1957

Name of School	No. urines examined	No. positive S. haematobium	No. faeces examined	No. positive S. mansoni	No. positive Hookworm spp.	No. positive Ascaris spp.	No. positive Taenia spp.
Mariveni School	245	96 (39·1%)	225	218 (97·7%)	4	11	5
Mohlaba H.K. School ..	383	213 (55·6%)	301	291 (96·3%)	5	2	1
Mohlaba H.K. (other) ..	83	11 (13·3%)	83	21 (25·3%)	1	1	1
Khuyane (Mohlaba) ..	157	84 (53·9%)	96	86 (89·5%)	1	4	—
Dan School	388	174 (44·8%)	315	289 (91·1%)	39	15	4
Rita Thabina	172	125 (72·7%)	130	113 (86·9%)	3	2	—
Metz	60	52 (86·7%)	54	39 (72·2%)	12	5	2
Thabeng (Magoboya) ..	154	88 (59·1%)	130	85 (65·4%)	3	3	—
Nthabena (Letsitele) ..	97	67 (69·1%)	48	30 (62·5%)	12	0	3
Thabina School	89	50 (56·2%)	56	34 (60·7%)	8	3	—
Loraine School	74	62 (83·9%)	45	24 (53·3%)	5	1	—
Maake School	214	141 (66·5%)	141	69 (49·0%)	4	12	1
Letaba Estate	111	81 (74·0%)	51	24 (47·1%)	13	12	2
Phalaborwa	31	19 (61·3%)	86	27 (31·4%)	2	4	1
Balloon School	85	53 (62·4%)	67	13 (20·0%)	16	15	—
Mashati	254	145 (57·0%)	152	20 (13·1%)	28	13	—
Mabelek (Mamathola) ..	334	19 (5·8%)	119	11 (8·4%)	59	25	—
Sekororo	200	144 (72·0%)	210	16 (7·6%)	103	115	1
Maghonga School ..	215	47 (22·0%)	146	9 (6·1%)	26	14	3
Total	3,356	1,669 (49·7%)	2,455	1,419 (57·8%)	344 (14%)	257 (10·5%)	24 (0·98%)

ova of *Ascaris* and *Ancylostoma* species occurred in the stools of a high percentage of Native children attending schools situated along the Eastern slopes of the Drakensberg in the Transvaal.

Although bilharziasis was first reported in this country by Harley[3] in 1864, little success has been achieved in its control. Craig and Faust[4] wrote in 1954: 'Diseases of trematode aetiology may theoretically be relatively easily controlled by the simultaneous application of the following methods: (1) Chemotherapy of all cases of the disease discovered in the population, (2) anti-molluscan campaigns, (3) disinfection of excreta or their sanitary disposal, (4) education of the population.'

Similar proposals for the prevention and control of this disease had already been put forward by Manson-Bahr[5] (1947), Price[6] (1950) and Strong[7] (1945). According to these, a successful bilharziasis control scheme for the affected area of nearly 60,000 square miles in the Northern Transvaal should provide for (1) the mass oral drug treatment of an infected Native population between the ages of 4 and 16 years, estimated conservatively at 50,000, with an efficient anthelminthic under the supervision of an adequate medical staff; (2) the destruction by an experienced field staff using an effective molluscicide of the vector snails in the numerous irrigation systems large and small, and in natural water courses; (3) improved methods of sanitary disposal of

General Consideration of Mass Oral Chemotherapy

Official attempts at large-scale chemotherapeutical control were started in 1927, when the Transvaal Bilharzia Committee came into being and arranged for mass therapy of groups of European school children at holiday camps (Kieser[8]). The course of treatment, initially with intravenous antimony tartrate, certainly had excellent results in the curing of individuals with haematobium bilharzia, but the effect of the various annual campaigns on the epidemiological situation was limited. The factors responsible for this were the lack of a coordinated campaign of snail destruction, the limited extent to which infected Native children were treated at the same time, the fact that mansoni bilharzia was not adequately investigated, and the sporadic and localized nature of the educational campaign amongst the population exposed to infected water.

During the 1957-58 chemotherapeutical trials it was considered to be an essential preliminary step to try to establish complete control of molluscan vectors by means of an attack on unsatisfactory environmental conditions through public education. During the preparatory period all the standard epidemiological and clinical investigations were carried out by the same medical officer throughout to ensure the greatest measure of uniformity. The results and data obtained are stated below in two sections, dealing

TABLE III. GENERAL AND CLINICAL COMPOSITION OF SCHISTOSOME-INFECTED SCHOOLCHILDREN GROUPS

		Tzaneen		*Nylstroom*	
		A—Urban	*B—Rural*	*C—Urban*	*D—Rural*
Number Observed or Examined	..	445	975	93	67
Tribal Distribution					
Sotho group	%	94	10	78	72
Shangana-Tsonga group	%	6	90	10	1
Sex					
Males	%	55	64	60	70
Environmental Sanitation					
Household water, open source	%	2	83	0	100
Indiscriminate faecal disposal	%	60	100	0	100
Diet					
Fairly balanced	%	100	43	100	3
School Performance					
Physically fit	%	95	88	81	99
Regular school attendance	%	92	82	85	60
Clinical History and Examination					
Haematuria	%	6	28	62	52
Blood in stools	%	2	6	0	33
Obvious malnutrition	%	15	25	10	4
Liver enlarged (2 fingers +)	%	22	30	28	24
Palpable spleens	%	3	3	0	0
S. haematobium infections	%	49	51	100	100
S. mansoni infections	%	87	96	0	0
Special Tests					
Number investigated	..	137	20	12	—
Haemoglobin below 10 g. %	%	96	2	0	—
Plasma proteins above 6·5 g. %	%	100	92	58	—

with (*a*) the clinical investigations, and (*b*) the chemotherapeutical trials.

I. CLINICAL INVESTIGATION OF SCHISTOSOME-INFECTED CHILDREN

Method

The clinical examination and the special tests were supplemented by questionnaires completed by the teachers at the schools concerning the environmental sanitation, the water supply, the child's diet at home, and his performance at school. Only satisfactorily completed questionnaires were taken into account. The results are reflected in Table III.

For the spleen examination each child was examined in a recumbent position, and the following laboratory examinations were carried out afterwards.

Urine. After physical exercise, the whole volume of urine of each child was collected in a separate wide-mouthed bottle. After this had stood for at least 30 minutes, the supernatant urine was decanted and the remaining fluid (approximately 5 ml.) placed in a centrifuge tube and centrifuged for 2 minutes at 1,000 r.p.m. A drop of the sediment was then examined microscopically.

Faeces. The entire stool was collected and from the outer portion or the part containing mucus or blood about 5 g. was removed and shaken up thoroughly in a test-tube with 5 ml. of 10% solution of sodium sulphate. It was then filtered through a fresh piece of mosquito-mesh wire-gauze into a centrifuge tube to which was added an equal volume of technical ether. It was centrifugated at 1,000 r.p.m. for 2 minutes and the upper layers of faecal debris and ether poured off afterwards. A drop of the sediment was examined microscopically.

Haemoglobin and total plasma proteins. The copper sulphate method 9 was used for the measuring of specific gravity of whole blood and of plasma. For school A the field method was used, while for schools B and C the estimations were carried out by the South African Institute for Medical Research at Pietersburg. Haemoglobin and plasma-protein estimations were made only in those children with enlarged livers or palpable spleens or severe malnutrition.

By examining a thick blood-smear a search was made for malaria parasites in the children with palpable spleens. No parasites could be demonstrated. Serological tests for syphilis were also carried out on this group in the Mohlaba schools (see B in Table III), and positive Wassermann tests were given by 9 children out of 45 (20%), of whom 7 had enlarged livers of 3 fingers or more and 2 had spleens that were just palpable.

Results

The children of 4 schools were systematically examined in this way and in Table III a comparison is made of the findings at an urban school A and a rural school B in the Letaba district, where *S. mansoni* bilharziasis predominates, and an urban school C and a rural school D in the Nylstroom district, where *S. mansoni* infections are not found. A study of Table III reveals the following important points:

1. Bilharziasis does not show any predilection for one or other of the major ethnic groups.

2. Males probably expose themselves to infection to a greater degree than females.

3. Although there was an obvious difference between the environmental sanitation of urban and rural areas, conditions such as overcrowding and bad siting favour the spread of bilharziasis in urban locations.

4. The Native children of urban areas have a fairly balanced diet—including starch, vegetables, and meat at least twice weekly. Obvious signs of malnutrition were found especially in rural school B (Mohlaba), where mealie-meal forms the bulk of the diet.

5. The general performance of the scholars does not suggest the presence of a debilitating disease.

6. Notwithstanding a high incidence of bilharziasis, clinical signs suggestive of the disease were not in evidence.

7. Enlarged livers were quite common and in many instances the liver edge could be more easily felt in the epigastrium than along the outer side of the rectus muscle. The place of bilharziasis in the causation of these enlarged livers will have to be investigated together with the question whether the so-called hepatosplenic bilharziasis (Benaim Pinto[11] syndrome) is commoner in South Africa than is generally believed. Hepatic manifestations did not at this stage offer much help in establishing a clinical gradient for bilharziasis because irreversible progressive cirrhosis would probably only follow massive worm infestation (Zerpa Morales[12]).

8. According to our findings an enlarged spleen was part of the pathological picture of mansoni bilharzia rather than of malaria; because the low malarial parasite rates found during random blood surveys in this area would indicate proportionately low malarial spleen rates (Brink[10]).

9. The epidemiological picture of bilharziasis differs from region to region. West of the Drakensberg ridge mansoni-infected reservoirs were found only in a few small and circumscribed localities, whereas the incidence was high in the subtropical North-Eastern Transvaal.

10. The haemoglobin and plasma-protein values were not lowered beyond critical levels.

II. EXPERIMENTAL CHEMOTHERAPEUTIC TRIALS IN SCHISTOSOME-INFECTED SCHOOLCHILDREN

From the literature on chemotherapy in bilharziasis it seems clear that the ideal drug is still to be discovered. What is wanted is a drug that is effective when taken orally and produces no serious side-effects. The treatment should be completed within a school week or 5 days, because it is schoolchildren that can be reached most readily for mass treatment.

Our choice of drug and dosage as well as duration of course was based mainly on the results obtained by workers in Southern Rhodesia.[13] They have recommended lucanthone hydrochloride in a dosage schedule based on 60 mg. per kg. of body-weight. The total dosage is spread over 3 days.

The field of anti-bilharziasis chemotherapy has been extensively explored by workers in their search for the ideal oral drug.

Abdel Azim *et al.*[14] were successful with lucanthone hydrochloride and this drug was used by Blair *et al.*[15] in a dosage of 15 mg. per kg. for 5 days in mass treatment. Newsome and Halawani,[16] claimed a high cure rate with repeated oral courses.

Against urinary bilharziasis Schwetz[17] had good results with nilodin. Alves and Gelfand[18] went a step further by giving antimony orally, but considered the results with oral antimony compounds as most disappointing.

In a departmental report, Annecke (1954) stated that mass treatment trials with fuadin in the previous year were unsuccessful, for only 38 persons out of an initial number of 150 went on to receive the full course. In the same year experimental campaigns with nilodin and miracil D had to be abandoned because of severe side-effects (Pitchford[19]).

In 1956 further reports came from severa workers,[20-22] and in the same year Parodi *et al.*[23] used one of the basic desoxybenzoins (1183TH) in an oral preparation for old-standing mansoni infections. With negligible side-effects the cure rate was high after 3 months; but as only 18 cases were treated a definite conclusion will only be arrived at after trials with larger numbers. In most of the published work the numbers of patients in the treatment groups were too small.

A more comprehensive trial was conducted by Halawani *et al.*,[24] in Egypt, where 350 cases of urinary bilharziasis were treated with miracil D as out-patients, while 114 cases of intestinal bilharziasis were treated in hospital. The authors concluded that miracil D is satisfactory in the treatment of ambulatory cases of urinary bilharziasis, but not so effective in those with intestinal bilharziasis.

Closely related to the question of drug and dosage is the final test of cure. Rowland[25] and Newsome[26,27] dealt with this thoroughly and from their reports one is convinced that the final test of cure should include at least both urine microscopy and the hatching of eggs.

Finally, in a critical review of the treatment of bilharziasis, Schneider[28] differentiates between the aims in treatment of the clinician and the epidemiologist. The object of the epidemiologist is to suppress the infection sufficiently to interrupt transmission; radical cure is illusory in an endemic area where patients are constantly subjected to reinfection.

Experimental Chemotherapy

For the trials in the Northern Transvaal it was decided to subject lucanthone hydrochloride to several small-scale tests before embarking on a major trial. In these tests Nilodin (Burroughs Wellcome) and Miracil D Co. (Bayer) were used in different dosages over a varying number of days and a close study was made of the possible toxic effects as well as the methods of obviating it. These pilot tests showed the following:

1. In a course of treatment of 4 days' duration it does not make any difference to the cure rate whether the dosage of miracil D is 40 or 60 mg. per kg. of body-weight. In both groups 50% of the urines were sterilized at the end of 6 weeks.

2. When miracil D is given in a dosage of 70 mg. per kg. over 4 days severe side-effects are encountered. The toxic effect of lucanthone hydrochloride, which upsets the Native child mostly, in either infection, is *dizziness with disturbance of equilibrium.*

3. A little porridge or soup taken with the tablets minimizes side-effects.

4. Belladonna either incorporated in the tablet or given separately will diminish the abdominal distress occasionally experienced with these drugs.

5. A group of 42 schoolchildren with urinary bilharziasis were treated with miracil D co. in a dosage of 100 mg. per kg. over 10 days. After 6 weeks the urines of 50% of the groups were found to be negative with 2 tests a few hours apart.

6. Excellent results were obtained in a group of children with urinary bilharziasis only where nilodin was given in a total dosage of 200 mg. per kg. over 10 days. Unfortunately toxic reactions were common and combined with the long duration of the course resulted in a high percentage of absentees in the second week of treatment. Nilodin in a dosage of 140 mg. per kg. over 20 days gave comparatively poor results with very few side-effects in a group of children suffering from urinary bilharziasis.

Based on these findings an extensive trial was planned for the Tzaneen Native school. The 445 infected children were divided into 3 groups according to the drug administered to the group namely, miracil D co., nilodin or Blaud's tablet (tab. ferri carb.). The latter was used as a placebo for the control group. The children were weighed beforehand and the therapy conducted under direct medical supervision; the first treatment taking place after school had opened and the next treatment before the children went home. Toxic side-effects in the form of disturbances of equilibrium occurred in about 1 or 2% of the children treated with nilodin or miracil D co.

In the follow-up period, extending over 9 months, the same method of examining the urine and faeces was applied and where viable eggs with distinct and clear outline were found microscopically at a single test they were taken to be positive. Discoloured eggs were taken as a negative finding.

Results

The results of the treatment are illustrated in 2 figures and 2 tables. Table IV represents 3 approximately equal groups suffering from a mixed *S. mansoni* and *S. haematobium* infection, while Fig. 1 represents members of the three groups

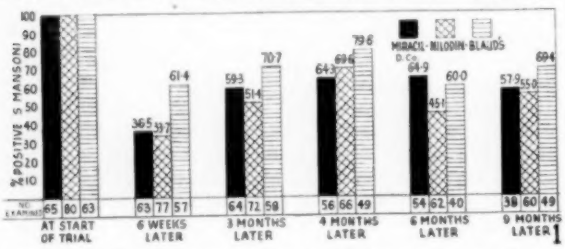

Fig. 1. Chemotherapy of school children infected with *S. mansoni*.

who did not show the additional infection with *S. haematobium*. In Table V are shown 3 groups of children treated with miracil D, nilodin and tab. ferri carb. respectively (some suffering from a mixed infection), while those represented in Fig. 2 showed no infection other than with *S. haematobium*.

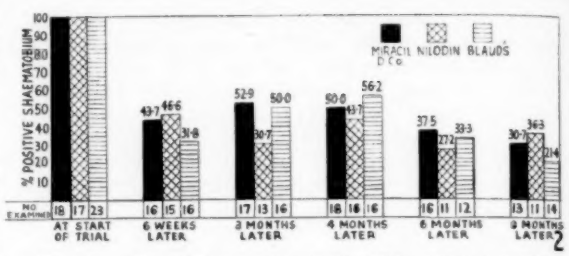

Fig. 2. Chemotherapy of school children infected with *S. haematobium*.

A comparison of Figs. 1 and 2 shows fairly clearly that at the end of 9 months many more of those suffering from *S. haematobium* (Fig. 2) had become negative than those infected with *S. mansoni* (Fig. 1).

Figs. 1 and 2 indicate a marked initial fall in the number of positives at the first test after treatment, followed by a rise at later tests. No reason for this phenomenon can be advanced unless it is due to temporary incapacity of the schistosomes with subsequent recovery of their egg-laying ability after 6 weeks to 2 months. If the first treatment injured the schistosomes as markedly as shown in the figures then it may be concluded that a second and subsequent treatments during the parasites' convalescence may lead to its ultimate destruction. This conclusion is being tested by giving 3 or 4 treatments in full doses ranging over 1 or 2 days repeated at intervals of 3-4 weeks.

TABLE IV. LARGE-SCALE CHEMOTHERAPEUTIC TRIALS IN BILHARZIA: S. MANSONI: TZANEEN BANTU SCHOOL: 1957

Drug	Age-group (years)	Start Pos.	Start Neg.	6 weeks Pos.	6 weeks Neg.	3 months Pos.	3 months Neg.	4 months Pos.	4 months Neg.	6 months Pos.	6 months Neg.	9 months Pos.	9 months Neg.	% neg. at start	% neg. at 9 mths.
Miracil 40 mg. per kg. ..	5— 9	37	9	16	26	28	15	24	12	25	10	13	11		
	10—14	71	8	34	37	37	20	52	16	44	19	39	19		
	15+	5	0	1	4	2	3	2	2	2	3	1	0		
Total		113	17	51	67	87	38	78	30	71	32	53	30	13·1	23·1
Nilodin 40 mg. per kg.	5— 9	45	6	10	39	17	27	24	19	18	23	20	17		
	10—14	71	10	33	42	43	30	51	20	34	33	38	27		
	15+	6	1	2	5	4	2	5	2	2	3	0	3		
Total		122	17	45	86	64	59	80	41	54	59	58	47	12·2	33·8
Blaud's 5 gr.	5— 9	36	7	24	14	23	14	21	12	17	11	22	7		
	10—14	64	12	44	21	44	20	50	9	26	26	50	8		
	15+	7	0	1	5	5	2	7	0	3	3	1	2		
Total		107	19	69	40	72	36	78	21	46	40	73	17	15·1	13·5

The headings stand respectively for 'At start of treatment', '6 weeks after treatment', '3 months after treatment', etc. Miracil = Miracil D Co. Blaud's = Tab. Ferri Carb

TABLE V. LARGE-SCALE CHEMOTHERAPEUTIC TRIALS FOR BILHARZIA: S. HAEMATOBIUM: TZANEEN BANTU SCHOOL: 1957

Drug	Age-group (years)	Start Pos.	Start Neg.	6 weeks Pos.	6 weeks Neg.	3 months Pos.	3 months Neg.	4 months Pos.	4 months Neg.	6 months Pos.	6 months Neg.	9 months Pos.	9 months Neg.	% neg. at start	% neg. at 9 mths.
Miracil 40 mg. per kg. ..	5— 9	19	28	19	22	15	28	15	22	18	19	8	15		
	10—14	45	34	20	55	14	58	26	39	19	44	13	45		
	15+	1	5	0	6	0	6	1	5	0	6	0	1		
Total		65	67	39	83	29	92	42	66	37	69	21	61	50·7	46·2
Nilodin 40 mg. per kg. ..	5 —9	22	29	15	32	14	30	15	29	14	28	9	28		
	10—14	36	45	18	62	12	62	29	46	19	42	12	43		
	15+	1	6	0	7	0	7	0	7	0	4	0	3		
Total		59	80	33	101	26	99	44	82	33	74	21	74	57·5	53·2
Blaud's 5 gr.	5— 9	23	20	21	16	16	21	13	21	12	20	9	20		
	10—14	38	38	11	53	11	51	31	29	17	39	21	43		
	15+	2	5	1	5	0	7	1	5	1	3	2	1		
Total		63	63	33	74	27	79	45	55	30	62	32	64	50·0	50·8

See interpretations at foot of Table IV.

Tables IV and V lead to the following deductions, some of which are based on the statistical analysis carried out by the consultant statistician of the King George V Hospital in Durban:

1. The differences between the 3 treatment groups do not appear to be statistically significant.

2. In the initial rise and subsequent fall in the percentage number who remained negative two conclusions are possible, viz. (*a*) high reinfection rate and (*b*) ineffective blood-level and short duration of action of drug and consequent recovery of the worm. The high rate or reinfection is demonstrated by the additional finding that, out of the 143 bilharzia-free and untreated children tested before the start of treatment in others, 49% became positive for *S. mansoni* and 15·4% for *S. haematobium* at the end of 4 months.

3. Table VI suggests that very few of the treated children can be classified as cured after 9 months and demonstrates the difficulty at this stage of curing infected Bantu school-children with mass oral drug therapy in spite of simultaneous intensive efforts at vector control. Mass treatment may have reduced the worm load and consequently later complications. It may also help to change the epidemiological picture if the dosage is repeated every 3 or 4 months. This is being tested at present in the Mohlaba schools, where miracil D co. is being administered to approximately 1,500 children at more or less regular intervals in a dosage of 40 mg. per kg. over 3 or 4 days.

TABLE VI. CHEMOTHERAPEUTIC TRIALS: TREATED CASES CONSECUTIVELY NEGATIVE AT FOLLOW-UP EXAMINATIONS

Treatment group	*S. haematobium infections*		*S. mansoni infections*	
	Total number positive at start of trial	*Constantly negative over 5 consecutive follow-up examinations*	*Total number positive at start of trial*	*Constantly negative over 5 consecutive follow-up examinations*
Miracil D. Co ..	65	12·5%	113	0·1%
Nilodin	59	11·8%	122	1·6%
Blaud's Tablet ..	63	6·3%	107	0%

OTHER MEASURES

Anti-mollusc Work

The snail-destruction campaign was conducted in those natural rivers and streams which formed the *habitat* of the vector snails. Copper sulphate had been used in the past and the sulphating of the waters was applied at the so-called contact points where activities such as swimming, bathing and washing suggested continued and close contact between man and vector. The copper sulphate was applied to the water surface in a concentrated solution with a copper or brass sprayer. The concentration was calculated according to the depth of water and the size of the pool so as to produce a final dilution of 10-20 parts per million. Aquatic vegetation had usually to be removed manually before sulphation to prevent deviation of the copper sulphate by organic and other materials.

A country-wide programme of applying copper sulphate to natural bodies of water could not be contemplated at this stage. The introduction of a more effective molluscicide which may perhaps replace copper sulphate is awaited. Anti-mollusc measures of a more permanent nature, however, are of extreme importance in the planning of new irrigation systems. A piped water supply or the cementation of canals, which allows a faster flow of water, would amongst other advantages also prevent the growth of aquatic vegetation which protects snail life and reduce seepage and pool formation which favours vector breeding.

Furthermore, to prevent snails from migrating from the natural rivers and streams into irrigation systems, an efficient snail trap or screen must be constructed.

Educational Campaign

Bilharziasis is a fair indication of a deficient standard of environmental hygiene and the lack of a sanitary conscience in the community. Tradition dies hard, and it is only after intensive precept and sustained teaching that the Bantu people, especially the rural Bantu, will eventually as a whole realize and accept the necessity for proper sanitation. Not only the health and education authorities, but civil administrators in rural areas and employers of Bantu labour like farmers and managers of factories, mines and estates will have to help in creating a sanitary conscience in the Bantu.

The Department of Health is actively engaged in this great task of creating a more critical sanitary attitude. A mobile film unit travels through Bantu areas and a fairly high proportion of the population is in this way inducted in the basic rules of health. In addition, courses in hygiene are organized for our own Bantu field staff, Bantu school teachers and for chieftains and other Bantu leaders.

Concomitant with the educational campaign for a better sanitary conscience, is the need for all to avoid exposure to the infection. The Bantu children live at a continuous risk and an arduous task awaits those whose work it is to persuade the Bantu of the necessity of using only safe bathing places and purified household water. The Bantu makes contact in the watery habitat of the infected snail sometimes simply for the purpose of recreation but usually through necessity to wash or quench thirst. In Europeans such contact can be considered as foolhardiness or stupidity, because it was shown by Kieser,[8,29] of the Transvaal Bilharzia Committee, that all the streams in the warmer parts of the Transvaal from Zeerust and Rustenburg northwards to the Limpopo and eastwards to Komatipoort must be considered as potentially infected. For those who live in the Northern Transvaal a safe or purified water supply is advocated. Where boreholes cannot be utilized, water should be used which has been subjected to sedimentation, filtration and chlorination.

The medical profession can influence public opinion greatly if these aspects of the bilharziasis problem are presented by the medical practitioner to his patient.

CONCLUSIONS

1. Investigations in connection with the prevalence of bilharziasis in the Northern Transvaal have revealed the high incidence of helminth infections in general. The problem of bilharziasis may in the future be considered as only a subdivision of the wider problem of helminthiasis in this area.

2. It is not clear at this stage whether the finding of schistosome ova in human excreta is evidence of somatic pathological processes. In almost all the infected school children none or relatively few abnormalities could be

discovered with the clinical examinations. The question therefore arises whether bilharziasis should be regarded as a disease in the Native or may be considered to be a harmless host-parasite relationship.

3. Mass therapeutical procedures with oral drugs which can be carried out both safely and effectively within a period not exceeding the normal school week do not, with the drugs at present available, offer a solution of the problem of bilharziasis in the Northern Transvaal.

4. Permanent anti-bilharziasis measures like improved environmental hygiene constitute our most effective weapon. Education in this respect is needed and the medical profession can play an important role in cooperating in the enlightenment of the public.

SAMEVATTING

Die omvang van bilharzia word aangetoon in die lig van ondersoeke wat in die afgelope jare uitgevoer is in Noord-Transvaal.

Daar word aangetoon dat bilharzia 'n parasitiese wurmaandoening is wat teoreties behoort uitgeroei te kan word deur die verbreking van een of meer van die skakels in die lewensloop van die betrokke Schistosoma-soort. Op proefondervindelike wyse is die onderdele van 'n dergelike program van bilharzia-beheer op bepaalde plekke toegepas.

Die toediening van geneesmiddels per mond op 'n massaskaal is voorafgegaan deur 'n soortgelyke epidemiologiese en kliniese ondersoek van aangetaste Bantoe-skoolkinders. Die inligting hierdeur verskaf word in tabelvorm weergegee en oor die algemeen kon daar min klinies verkeerd gevind word in kinders van wie die urine en stoelgang Schistosomaeiers bevat het.

Ons het nog nie die wonderstof om bilharzia op groot skaal met chemoterapeutiese middels te probeer uitwis nie. Vergelykende studies tot 9 maande na behandeling, het min verskil aangetoon tussen nilodin en miracil D. ko. in 'n dosis van 40 mg. per kg. gegee in 'n totale dosis oor 4 dae. Weliswaar het die uitwerking van altwee nie veel verskil van die kontrolemiddel wat gegee is aan 'n derde groep kinders nie. Kliniese genesing kon in slegs 'n klein persentasie aangetoon word en dit kan ook gewyt word aan voortdurende herbesmetting. Dit mag moontlik epidemiologiese waarde hê om die wurmlading in die bevolking te verminder deur herhaalde behandelings in 'n digbewoonde Bantoegebied waar die slakbesmette waters hulle self tot slakbeheer leen.

Verbetering van die omgewingshigiëne en verhoogde lewenstandaarde gaan beslissende faktore word in die stryd teen bilharzia. Die geneeskundige professie het 'n belangrike voorligtingstaak in hierdie wye program van siektebestryding deur middel van voorligting.

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AN ACUTE OUTBREAK OF STAPHYLOCOCCAL ENTEROTOXIN FOOD POISONING

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It was mainly due to G. M. Dack and his co-workers[1] (1930) that the attention of the medical profession was focused on certain groups of staphylococci as a cause of food poisoning outbreaks.

In 1950 Feig[2] reported that 78% of all food-poisoning outbreaks occurring in the USA were due to this group of organisms. In contrast to this finding, it would appear from a study of the medical literature that in the UK the largest proportion of food poisoning outbreaks are caused by the salmonellas. The reason for this difference is not obvious.

According to Carter[3] very few food outbreaks were reported upon or investigated in Glasgow—with its population of over a million individuals—before 1946. The true position regarding food poisoning in that city is in no way reflected by the available laboratory records or investigations. Since the attention of epidemiologists and public-health personnel has been focused on food as a cause of serious and acute illness in Glasgow, 519 incidents have been reported between 1946 and 1955, in which no less than 1,676 persons were involved. Only 6% of the total food-poisoning incidents during this period were due to staphylococci.

Du Bos[4] (1948) reports that fatalities are rare in staphylococcal food poisoning, only 8 deaths having been recorded in several thousand reported cases, and that of these only 4 could reasonably have been directly attributed to the food-poisoning episode. He suggests that the severity of the attack varies with the amount of enterotoxin ingested.

An Australian Outbreak

In 1954 Crowe[5] reported an explosive outbreak of food poisoning in the state of Victoria, Australia, due to the staphylococcus, in which phage typing was employed for the first time, in an effort to trace the source of infection. Food poisoning in this particular incident was promoted by hot summery conditions, and affected 80 individuals, 1/5th of the total number of persons who had partaken of a lunch of cold mutton and ox tongue at the annual agricultural show of a small Victoria town. The symptoms were classical. Within 2½-3 hours after the lunch a number of persons developed severe nausea, vomiting, abdominal cramp, prostration and collapse. Observers described the scene dramatically. Collapsed patients were lying round the showgrounds and in the garden of the local doctor's house. Others were vomiting from cars into the street gutters. The scene resembled a battlefield in miniature.

Food poisoning is not a notifiable disease in Australia, and it was only several days later that the State Department were apprised of the outbreak. Dumped foodstuffs left over from the lunch were found in the showgrounds and yielded heavy growths of coagulase-positive staphylococci which, on phage typing, were found to be identical with those recovered from the noses of 3 persons who served at the lunch in question.

An American Outbreak

Wain and Blackstone[6] report a staphylococcal food-poisoning outbreak amongst persons attending a picnic at Mansfield, Ohio, USA, on 17 September 1955, in which 120 individuals were brought to the local hospital out of 306 persons at risk. A further 124 persons were also affected, but not sufficiently seriously to attend or be admitted to hospital. Notwithstanding the severity of the symptoms during the time of the attack, most individuals recovered within 24 hours, whether they had received treatment or not.

All affected gave a history of consuming ham, and all without exception volunteered that the ham had no abnormal taste or odour and could only be described as being delicious. The hams in question were slow-baked all night on 16/17 September, and then boned and sliced by an individual who was suffering from open acne pustules of the face. Thereafter the sliced hams were returned to the ovens, which were kept at 200°F until 2 p.m., when they were collected and transported in the back of a station wagon, on a day when the mean temperature was 90°F, before being consumed at 6 p.m. that evening. Cultures obtained from the acne lesions proved to be identical with those recovered from the hams in question.

Wain and Blackstone[6] also refer to the short incubation period of 1-6 hours in staphylococcal food poisoning and suggest that if the onset of symptoms is longer than 11 hours, staphylococcal gastro-enteritis can usually be ruled out.

They also adduce that the staphylococcal enterotoxin acts on the peripheral sensory nerve structures of the viscera and not on the vomiting centre in the fourth ventricle.

Practically every reported outbreak reveals that the incriminated food was handled or prepared by an individual who, on later investigation, was found to be a nasal carrier, or was suffering from acne or other septic skin lesion. In addition, it also appears to be a *sine qua non* that the food shall be stored at kitchen temperatures for several hours before serving. The reports indicate that the order in frequency of foods responsible are: (1) Meat products, particularly ham, (2) cream and custard products, (3) poultry.

THE PRESENT OUTBREAK

On Boxing Day, 26 December 1957 one of the largest local sports clubs in Cape Town was the sponsor of a bowls tournament not limited to their own members.

The club, which had recently been established, had erected a completely modern and up-to-date club house, included in which was a modern kitchen, whose design and size is such that provision of a limited number of lunches and teas for its members is possible. The refrigeration space available was strictly limited, and conformed to the needs and requirements for which the kitchen had been designed; but was never intended to store the quantities of foodstuffs necessary to provide lunches for the number of persons who were present at the club on the day in question.

The club's catering arrangements fell under the control of an honorary catering committee of members, and European and non-European cooks, waiters and kitchen staff were employed.

Three or four times a year the club sponsors a bowls tournament, when as many as 300 people can be expected to participate. On these occasions, with the assistance and help of club members, it has been the general practice of the club to provide cold lunches for this number.

For the tournament on 26 December 1957, when about 250 persons were expected, large orders were placed with outside suppliers for corned beef, salted fresh tongues, pickled herrings, vegetables, fruit, and ice cream. The tongues and corned beef were cooked in the club kitchen on the afternoon of 24 December and were left to cool overnight in the pantry. The weather over this period was particularly hot and humid.

On the morning of 26 December at about 11 a.m., during the preparation of the lunch by voluntary and paid members of the staff, two of the permanent kitchen staff made complaint of nausea and associated abdominal pain, followed shortly afterwards by vomiting. No association between this train of symptoms and the food which was being prepared was appreciated by the club secretary or the voluntary kitchen helpers, and the two staff members concerned, being incapacitated and of no further use to the club, were sent home by taxi.

Lunch was served from about 1.30 to 2.30 p.m., and about 1-1½ hours afterwards the first casualties occurred. The numbers affected mounted with alarming rapidity, until in a very short time large numbers of the members and their guests were lying all over the club house and grounds in various positions of prostration and collapse. Eye witnesses described the scene as a shambles, and likened it to the after-effects of the detonation of a high-explosive bomb.

Many who felt the first onset of symptoms, or saw what was happening to others, hastened to their cars and made for home as quickly as they could. The local ambulance service was busily employed all the afternoon removing casualties to hospital, where first-aid treatment was given to many before they were sent home; a number, however, whose condition was serious, had to be admitted to the wards.

Food poisoning is not a notifiable condition in South Africa, but the City Health Department heard of the episode at 7 p.m. the same day (Boxing Day), and was thus in a position to get first-hand information from unaffected club members still present on the scene, and to collect samples of the food remaining from the lunch. A check of the staff members the following day revealed no one with any evidence of septic skin lesions.

Detailed information furnished by about 120 affected individuals of this outbreak indicated that, with the exception of only 2 persons, all had either consumed cold tongue or corned beef, or both. Except for these two, the individuals who had not partaken of these meats were unaffected. Of about 290 persons who attended this function, no less than 220 were affected—some more seriously than others. No deaths occurred; although one individual, seriously ill, was kept in hospital for over 3 weeks.

Additional epidemiological evidence that these two items were responsible for the outbreak was the fact that it subsequently came to the notice of the Department that 2 non-European families who had partaken of pilfered portions of the meat on 25 December (Christmas Day) had been similarly affected and were in such a serious state that they also had to be hospitalized.

Bacteriological Investigations

Specimens of all available foodstuffs which were served at the lunch were collected and submitted to the Government Pathological Laboratory (Union Health Department), Cape Town, for bacteriological examination. A report received some days later indicated that a coagulase-positive *Micrococcus* (*Staphylococcus*) *pyogenes aureus* (fermenting mannite and liquifying gelatine) was isolated from the following articles of food consumed at the lunch in question: Ice cream, corned and sliced beef, pickled herring, strawberries, sliced tongue (from large part), french salad, beetroot soup, butter, and unsliced tongue. No *Micrococcus pyogenes aureus* was isolated from mayonnaise, milk, or the remains of the brine still present in the opened and empty barrel of pickled herring. More significantly, coagulase-positive *Micrococcus pyogenes aureus* was recovered from one sample of brine obtained from one of the brine vats at the premises of the butcher who supplied the corned beef.

All the positive cultures so obtained were submitted to the Bacteriological Department of the University of Cape Town for phage typing and comparison with cultures obtained there from the vomitus and faeces of victims of the outbreak admitted to the Groote Schuur Hospital.

As difficulty was experienced in carrying out phage typing of the culture material obtained from the foodstuffs and from the patients, the culture material was submitted to Dr. R. E. O. Williams of the Streptococcus and Staphylococcus Reference Laboratory, Central Public Health Laboratory, Colindale Avenue, London, who very kindly furnished a report from which the following results of phage typing are extracted:

Vomitus. Of 10 specimens of vomitus (K1-K10), 9 gave *Micrococcus pyogenes aureus* on culture. On phage typing, 2 of these cultures (K4 and K6) were found to be phage-group I, type 29, and 2 (K8 and K9) phage-group III.

Stools. Of 10 specimens of stool (K11-K20), 9 gave *Micrococcus pyogenes aureus* on culture. On phage typing, 4 of these cultures (K13, K16, K18 and K19) were found to be phage-group I, type 29.

From the one hospitalized patient who was seriously ill cultures of *Micrococcus pyogenes aureus* were obtained from stool specimens and material from a skin vesicle (K21 and K23). Both of these cultures were found to be phage-group I, type 29.

Cultures from food remains. The cultures of *Micrococcus pyogenes aureus* which were obtained from food remains on being phage typed gave the following result:

Ice cream	phage-type 29+
Sliced corned beef	phage-type 29
Fresh cream éclair	phage-types 29 and 77
Strawberries	phage-types 29, 79 and 77
French salad	phage-type 29+
Beetroot soup	phage-types 29 and 77
Unsliced tongue	phage-type 29

Other cultures were phage-typed as follows:

Nasal swabs from a member of the kitchen staff	phage-types 29 and 77
Brine from one of the vats in the butcher's shop	phage-type 29

From these data it would appear that phage-group I, type 29, was responsible for the outbreak in question. According to Dr. Williams, group I, type 29, is an unusual staphylococcal strain and, in his experience, has not in the past been implicated as the cause of a food-poisoning outbreak.

Commentary

As it was only those persons who had consumed cold tongue or cold corned beef who were affected in this food-poisoning outbreak it can with certainty be inferred that these two articles contained large quantities of preformed enterotoxin, and that this was occasioned by the fact that owing to inadequate cold storage facilities they were permitted to cool down overnight in a hot pantry adjacent to the kitchen at a time of high atmospheric temperature.

The recovery of phage-type 29 from brine obtained from one of the brine vats of the butcher supplying the corned beef appears to be more than significant.

Phage-group I, types 29 and 77, were also isolated from a nasal swab from one of the permanent kitchen staff at the club. While it could be considered that this individual might have been responsible for the outbreak of food poisoning, the fact that a culture which conformed to phage-group I, type 29, was isolated from a specimen of brine from one of the brine tanks situated in the shop of the butcher who supplied the corned beef for the lunch in question is more indicative that this was the source of the present outbreak.

The recovery of this phage type from the tank in question, and its presence in foodstuffs such as French salad, strawberries and beetroot soup—articles of food not usually responsible for food-poisoning outbreaks—leaves me with no alternative but to postulate wide dissemination of this organism from the corned beef *via* preparation tables, knives and hands of the kitchen staff to practically every article of food used at this function, as well as to the nares of one of the food handlers on the permanent staff.

It is also categorically possible to suggest that, notwithstanding the one infected brine tank and its meat contents,

this outbreak would not have occurred—or had it occurred its effects would have been strictly limited—had suitable and satisfactory facilities been available for the rapid and immediate cooling and storage of those products likely to serve as a media for the multiplication of the various types of pathogenic organisms which play so important a part in outbreaks of this type.

SUMMARY

1. This would appear to be the most extensive outbreak of food poisoning caused by a coagulase-positive *Micrococcus (Staphylococcus) pyogenes aureus* enterotoxin which has been reported in the Union of South Africa. Of approximately 290 individuals at risk, no less than 220 were involved and developed the classical signs of this type of food poisoning.

2. The use of a kitchen not designed, nor suitable, for providing the large number of meals required on this occasion played a not insignificant part in the occurrence of the present outbreak.

3. The limited refrigeration facilities in keeping with the purpose for which the kitchen had been designed and which necessitated hot cooked corned beef and tongue having to be cooled down in a hot pantry at a time of the year when atmospheric conditions were ideal for bacterial proliferation were directly responsible for the severity and intensiveness of the outbreak.

4. The necessity for rapid and effective cooling of all foodstuffs which are to be retained for subsequent use could not be better brought out than by the present outbreak.

5. The importance of preventable food-poisoning outbreaks such as described here is not without significance to the catering industry, the medical profession, and the health departments of central and local authorities.

I would take this opportunity of thanking Prof. R. Turner and Dr. L. S. Smith, of the Union Health Department, Prof. A. Kipps and the staff of the Bacteriological Department of the University of Cape Town, and Dr. R. E. O. Williams and the staff of the Streptococcal and Staphylococcal Reference Laboratory, Colindale Avenue, London, N.W. 9, for reports on the bacteriological investigations and phage-typing results which are set out in this paper.

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IN MEMORIAM

NORMAN BLIGH PEACOCK, B.Sc., M.B., CH.B. (GLASG.), D.T.M. AND H. (L'POOL)

Dr. William Jack, of Hermanus, writes: On 17 May 1959 Dr. Norman Peacock died suddenly at his home at Onrust River, Cape, at the age of 64.

Dr. Peacock was born in Edinburgh in 1894, was educated at the George Watson College, Edinburgh, and at Glasgow University, where he took his B.Sc. degree, and graduated in medicine in 1918. Within a week of graduation he was in a casualty clearing station in France.

After the War Dr. Peacock took a diploma in tropical medicine at Liverpool and then joined the British Colonial Service. After serving for 12 years in East Africa, he took over a general practice in Rondebosch, Cape, where he was a well-known and well-respected family doctor, until he retired in 1946. Eventually Dr. Peacock settled in Onrust, where he was able to devote more time to his great interest—entomology. He had practically finished a book on this subject when he died.

Dr. Peacock had a very active mind and his interest in medical affairs never flagged. He helped me in my practice on several occasions and I could not have found a more conscientious and satisfactory locum. I have also worked with Dr. Peacock on the committee of the Hermanus Bowling Club for several years and know that he will be greatly missed from his position as Secretary of the Club.

Dr. Peacock is survived by his wife and two sons, both of whom are doctors—Dr. P. B. Peacock, who is at present Medical Officer of Health at Germiston, and Dr. O. S. Peacock, who is an ophthalmologist in the Government service in Blantyre—and they write:

'We consider ourselves very fortunate to have had Dr. Norman Peacock as our father and his passing has left a gap which we shall be unable to fill. Always kind, considerate, and conscious of his patients, not only as individuals, but also as members of a family circle, he was the ideal of a general practitioner. We remember his going through his accounts and saying, "Do not charge Mrs. X—her boy needs a new pair of shoes". May he rest in peace.'

Dr. Peacock was an active member of the Medical Association. He joined the Association in 1933 and shortly before leaving Rondebosch was Hon. Secretary of the Cape Western Branch.

UNIVERSITY NEWS : UNIVERSITEITSNUUS

UNIVERSITY OF CAPE TOWN

The following degrees were conferred at the graduation ceremony held on Friday 26 June:

Doctor of Medicine: Stanley John Powell, M.B., Ch.B.

Master of Medicine (Obstetrics and Gynaecology): Nicolaas Solomon Louw, M.B., Ch.B.; Frans Karel te Water Naude, M.B., Ch.B.; Irénée Emil van den Ende, M.B., B.Ch.(Rand).

Master of Medicine (Pathology): Leonard Anstey, B.Sc., M.B., Ch.B.; Hugh Hodson Golby, M.B., Ch.B.; Gideon Muller Potgieter, M.B., Ch.B.; Alan Heinrich Timme, M.B., Ch.B.

Master of Medicine (Surgery): Gershon Efron, M.B., Ch.B.

M.B., Ch.B.: M. Aginsky; Mrs. F. P. Currie; F. Fiser; I. G. Immerman; A. H. Khan; A. Lekas; L. B. Levin; Mrs. D. D. Moodie; S. P. Roux; G. B. Soutter.

UNIVERSITY OF THE WITWATERSRAND

Kalahari Research Committee, University of the Witwatersrand. An expedition organized by this Committee on generous financial assistance from the Nuffield Foundation is at present under way to make the most comprehensive set of investigations on the Bushmen—and probably on any tribe or race in Africa. The present winter expedition follows earlier field-studies in August-September 1958 and January 1959, and by the end of the present expedition almost 40 scientists and assistants from Johannesburg will have spent time studying the Bushmen. The first leg of the winter expedition left Johannesburg on 6 June, under the leadership of Dr. Cyril Wyndham, director of the Applied Physiology Laboratory of the Chamber of Mines. The main party, of 12 members, left on 29 June under the leadership of Prof. Phillip V. Tobias, head of the department of Anatomy of the University of the Witwatersrand and chairman of the Research Committee. The party will spend some 5 weeks among the Central Bushmen in the vicinity of Ghanzi, in the heart of the Kalahari.

The aim of the expeditions is a systematic study of the inhabitants of the Kalahari with pride of place being given to the study of the Bushmen—this is not so much because their numbers are dwindling (recent estimates suggest that as many as 50,000 Bushmen may still

be alive), but because the surviving Bushmen are being subjected to pressures which threaten rapidly to change their conditions of life, and the Bushmen provide one of the few opportunities anywhere in the world today to study man under what are virtually Stone Age conditions of existence. The first 2 years of work have been mainly of a human biological character, but it is hoped that cultural, social, and linguistic studies will follow.

Dr. Wyndham's party is studying the way in which the Bushmen adapt to the heat of the Kalahari day and the bitter cold of its winter nights; they are concerned mainly with the physiological mechanisms. Professor Tobias's party is concerned in elucidating a number of problems connected with the peculiar anatomical features of the Bushmen. Their racial make-up and affinities will be deduced from hundreds of measurements and other observations. In addition, the blood-groups of the Bushmen will be investigated with the collaboration of Dr. A. Zoutendyk of the South African Institute for Medical Research and Dr. A. E. Mourant of the Nuffield Blood Group Centre in London. Genetical and nutritional studies will be included and the group is hoping to follow up certain ideas that some of the anatomical uniqueness of the Bushmen may depend on a different setting of the endocrine glands. Fingerprint patterns, another important source of comparative data among races, and the incidence of the gene for colour-blindness, will also be assessed.

The party will be accompanied by Dr. H. J. Heinz, senior lecturer in Pathology at the University of the Witwatersrand, his special object will be to study the parasites afflicting the Bushmen. Another branch of work will be that of Dr. J. F. van Reenen, lecturer in Dentistry, who will study the teeth and saliva of the Bushmen. Dr. van Reenen also participated in the 1958 expedition to the Kalahari and made some important observations on the low incidence of dental decay and on the bacteria in the mouth of the Bushmen. Yet another branch of the expedition will be concerned with the psychological testing of the Bushmen. This work will be carried out by Dr. H. Reuning of the National Institute for Personnel Research.

The present winter expedition will mark the end of the first cycle of expeditions and it is planned to publish a book about the end of 1960 containing all the results of the series of field-studies. It is hoped that the proposed Institute for the Study of Man in Africa will coordinate and extend such researches over large segments of Southern and Central Africa.

PASSING EVENTS : IN DIE VERBYGAAN

Drs. F. W. Roberts, M. S. Kramer, P. A. Caswell and H. van Hasselt, anaesthetists, have now opened rooms at 3 Admirals Court, Rosebank, Johannesburg, in addition to their rooms at 309 Harley Chambers, Jeppe Street, Johannesburg.

* * *

Association of Medical Students of South Africa. The first annual conference of this newly formed Association will take place at the University of the Witwatersrand on 10–13 July 1959. Medical students from the Universities of the Witwatersrand, Cape Town, Stellenbosch, Pretoria and Natal will attend, the students from Pretoria in the capacity of observers. It is hoped that the Minister of Health, Dr. the Hon. A. Hertzog, will open the Conference.

* * *

The South African Chemical Institute has invited members of the Medical Association of South Africa to attend a meeting of the Institute on Thursday 9 July at 8.30 p.m. in the New Lecture Theatre, Chemistry Department, University of Cape Town. Professor Erdtman, professor of organic chemistry at the University of Stockholm, who is visiting Cape Town with his wife Dr. Gunhild Aulin-Erdtman, will address the meeting on 'From local anaesthetics to plant anti-hormones'.

* * *

The American Rhinologic Society will hold its 5th Annual Meeting in the Belmont Hotel, Chicago, USA, on 10 October. This will be preceded by a surgical seminar in the Illinois Masonic Hospital, Chicago, on 7–9 October. Among the subjects to be discussed are 'Objective tests for nasal function', 'Trans-septal pituitary extirpation', 'Choices of the rhinologist in approaching the tear sac', 'Surgery of nasal malignancies', 'Tissue reactions to nasal transplants' and 'Basic immunology of bone transplants'. The first official showing of a new colour and sound film 'The human nose' will also take place. For further information write to Dr. Robert M. Hansen, Secretary, 1735 N. Wheeler Avenue, Portland 12, Oregon, USA.

* * *

Journées Pharmaceutiques Françaises. The 10th Congress (*Journées pharmaceutiques françaises*) organized by the Society of Pharmaceutical Technique (*Société de Technique Pharmaceutique*) will be held at the Faculty of Pharmacy, Paris, from 28 September to 2 October 1959. The programme will include conferences on pharmaceutical subjects; practical demonstrations in pharmacology, clinical chemistry, and bacteriology; visits to pharmaceutical factories and laboratories; and meetings of numerous French pharmaceutical societies. Social functions will include a performance at the National Opera House and a gala night in the Orangery of the Château of Versailles. Transport and accommodation by Wagons-Lits-Cook (South Africa, 30 Strand Street, Cape Town). Registration closes on 15 September. Applications for registration and remittances should be directed to the Secretary (Mme Tocque), at 2 Square de Luynes, Paris 7e, from whom further particulars may be obtained.

* * *

Malaria Eradication on a World Scale. The Governments involved in the fight for malaria eradication in the south-eastern part of the African continent (Union of South Africa, Southern Rhodesia, Mozambique, Bechuanaland, Swaziland) contemplate voting considerable funds to support this huge and beneficial project, according to a press statement issued by the World Health Organization. The Portuguese Government has just allocated £1,250,000 for eradication campaigns in Mozambique; but in the rest of Africa there are not enough qualified personnel and funds to meet the requirements for eradicating this disease. There is however no absence of goodwill and optimism towards the formidable task ahead, says the report. Malaria eradication and pre-eradication campaigns in Africa are carried out in close liaison, not only with the regional office of WHO in Brazzaville, but also with the headquarters in Geneva, which is playing an important part in the coordination of the vast efforts towards malaria eradication on a world scale. The battle proceeds simultaneously on two fronts—with insecticides against the mosquitoes, and against the malaria parasites within the human body by the mass distribution of effective anti-malaria drugs. Only a combined effort by national and international organizations can hope to achieve ultimate success.

NEW PREPARATIONS AND APPLIANCES: NUWE PREPARATE EN TOESTELLE

LES-CHOL

Marine Oil Refiners of Africa Ltd., in introducing Les-chol, supply the following comments and information:

The Western world is becoming increasingly conscious of the heavy toll taken by coronary thrombosis—one of the major 'killers' in civilized countries today, and medical research in most of these countries is intensifying its efforts to probe the mysteries surrounding the origins and progress of atherosclerosis. Many obscure problems have been illuminated by the searchlight of investigation, but every picture so exposed has been capable of multiple interpretation. Bronte-Stewart *et al.* have shown convincingly, however, that the incidence of heart disease is associated with a parallel difference in mean serum-cholesterol levels, and it has been demonstrated by many research workers that the serum-cholesterol level may be raised or lowered without difficulty by a suitable selection of the type of fat incorporated in the diet. Kinsell and Sinclair depressed cholesterol levels by the use of vegetable oils rich in essential fatty acids (EFA) and known to possess exceptional nutritional advantages. Bronte-Stewart *et al.* obtained the same effect with sunflower-seed oil, also rich in EFA, but indicated that highly unsaturated pilchard oil was even more

effective. Ahrens *et al.* demonstrated the superiority of a less highly unsaturated fish oil, Menhaden, over corn or maize germ oil, Menhaden having an exceedingly low EFA content, but a higher unsaturation level than corn or maize-germ oil.

Thus indications appear that the quality and quantity of dietary fat possess a considerable effect upon general health. In particular, oil research workers agree that, while consumption of animal and hydrogenated (hardened) vegetable fats raise the serum-cholesterol level, the intake of unsaturated vegetable and marine oils not only depresses the serum-cholesterol level but also neutralizes the effect of a concurrent intake of animal fats.

It has now become possible, by the appropriate treatment of pilchard oil in a 'Solexol' segregation plant (there is only one in Africa) to produce a 'fraction' consisting solely of poly-unsaturated fatty acids (multiple double bonds). This Solexol segregated fraction is known as Mariv, and has been found more effective than sunflower oil in lowering blood-cholesterol level.

A preparation which combines the high EFA content of sunflower-seed oil with the high degree of unsaturation of a 'Solexol' segregated fraction of pilchard oil (Mariv), has now appeared on the market under the brand name of 'Les-chol'. Les-chol is a palatable emulsion manufactured from South African sunflower-seed oil, with a minimum linoleic-acid content of 67%, and Mariv, a fraction consisting almost entirely of poly-unsaturated fatty acids segregated from pilchard oil. The product is amply stabilized and preserved and contains a maximum concentration (58·6%) of unsaturated fatty acids, as well as a suitable percentage of Vitamin B_6, which is considered an important lipotropic and metabolic agent. Les-chol is scientifically prepared for use by the medical profession as an aid in the management of hypercholesterolaemia, or as a dietary supplement in cases of deficiency in essential fatty acids.

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BOOK REVIEWS : BOEKBESPREKINGS

ARTERIËLE CHIRURGIE

Chirurgie der Arterien. Von Doz. Dr. K. Kremer. Pp. viii + 280. 150 Abbildungen. Ganzleinen DM 59.–. Stuttgart: Georg Thieme Verlag. 1959.

Die vinnige opkoms van die moderne arteriële chirurgie oor die afgelope 10 jaar het 'n behoefte vir 'n handboek oor hierdie nuwe spesiale gebied laat ontstaan. Hierdie boek voorsien tot 'n groot mate in hierdie behoefte.

In deel A word die algemene beginsels van arteriële chirurgie, soos diagnostiese metodes, operatiewe tegniek en slagaaroorplanting behandel. In deel B word spesiale slagaarchirurgie, insluitende aangebore afwykings van die aorta, verworwe letsels van die slagare soos beserings, afsluitings en aneurismas, en siektes van die koronêre vate bespreek. Hoewel fynere besonderhede van operatiewe tegniek hier en daar ontbreek, word oor die algemeen 'n baie goeie oorsig oor hierdie toestande gegee.

Die boek is met tipiese Duitse deeglikheid geskryf en is goed geïllustreer. Baie uitgebreide literatuuropgawes word aan die einde van elke hoofstuk gegee. Die boek is so opgestel en gedruk dat dit makliker leesbaar is as sommige vastelandse boeke.

Vir die wat in die onderwerp belangstel en Duits kan lees, kan hierdie boek bepaald aanbeveel word.

J.K.B.

PATHOLOGY

The Year Book of Pathology and Clinical Pathology (1957–58 *Year Book Series*). Edited by William B. Wartman, B.S., M.D. Pp. 478. 171 figures. $8.00. Chicago: Year Book Publishers, Inc. 1958.

To those who know the year book series, the format and style of the 1957–58 Year Book of Pathology and Clinical Pathology will be welcomed as a familiar and pleasurable publication.

Although there is an ample leavening of pure pathology in the sections on clinical chemistry, haematology and clinical microbiology, the subject matter runs the gamut of most recent trends—such as the uses of antisera labelled with fluorescein, new histopathological criteria in the study of nephritic diseases, routine quantitative enzyme determinations, and extracts of articles of recently defined viruses.

There are also valuable references to some established techniques and problems, e.g. the addis count, or the significance of plantar and palmar naevi.

In all, this is a nicely balanced year book which should have a broad appeal to all pathologists.

R.S.

CANCER

The Year Book of Cancer (1957–58 *Year Book Series*). Compiled and edited by Randolph Lee Clark, Jr., B.S., M.D., M.Sc. (Surgery), D.Sc. (Hon.) and Russell W. Cumley, B.A., M.A., Ph.D. Pp. 523. 191 figures. $8.00. Chicago: Year Book Publishers, Inc. 1958.

This year book publication—a worthy member of the large group of year books—emphasizes, if this were necessary, the value of this type of book. For the busy research worker in the field of oncology, for the medical author, and for everybody interested in the different aspects of cancer the book is essential. The 124 members of the editorial board have selected 235 articles from a total of over 4,000 published during the year for inclusion in the year book. The whole furnishes a first-class survey of the work done on cancer in the year under review and is of absorbing interest.

T.S.

FRACTURES AND OTHER INJURIES

Fractures and Other Injuries. By the members of the Fracture Clinic of the Massachusetts General Hospital and of the Faculty of the Harvard Medical School. Edited by Edwin F. Cave, M.D. Pp. xvii + 863. 612 figures. $28.00. Chicago: Year Book Publishers, Inc. 1958.

This book records the opinions and the experiences of the members of the Fracture Clinic of the Massachusetts General Hospital and of the Faculty of the Harvard Medical School. The intrinsic merit of this volume is considerably heightened by the inclusion of end-result studies.

Every chapter is written by an expert and the individual subjects are models of balanced presentation. It is refreshing to have various viewpoints put forward in a dispassionate way for the reader's consideration. The sections on injuries to spinal cord and cauda equina, and fractures and dislocations of the spine are very good examples of conciseness and simplicity. This trend is apparent throughout the book.

The methods advocated are very similar to the those used in present-day practice in Great Britain and South Africa, although one might quibble at the teaching of repeated manipulative attempts at reduction in supracondylar fractures of the humerus in children.

The book is printed on paper of good quality. The line drawings are clear and accurate, and the reproduction of the radiographs is of a high standard.

This account of 25 years' experience of the fracture clinic is aptly dedicated to the 'spirit of teaching' and would make a useful addition to any orthopaedic surgeon's library.

M.S.

PRACTICE OF OBSTETRICS

A Modern Practice of Obstetrics. 2nd edition. By D. M. Stern, M.A., M.B., B.Ch., F.R.C.S., F.R.C.O.G. and C. W. F. Burnett, M.D., F.R.C.S., F.R.C.O.G. Pp. x + 258. 141 line drawings. 45s. London: Baillière, Tindall and Cox Ltd. 1958.

The 1st edition of this book appeared in 1952 and this new 2nd edition comes 6 years later. The authors are attached to the West Middlesex Hospital in England.

The main feature of the book is its conciseness; while the authors

have tried to emphasize the normal and common abnormal conditions. The omission of the description usually found in text-books of this kind, of the normal anatomy and physiology of the female pelvic organs has also contributed to keep the size of the book to reasonable and manageable proportions. This particular feature cannot be regarded as a disadvantage since the student can always turn to the standard works on anatomy and physiology for this basic knowledge.

The views expressed throughout the book will, on the whole, be generally acceptable to most teachers of midwifery, and undergraduate students can therefore use it with confidence. The book is illustrated throughout by line drawings which, though serving their purpose successfully in most instances, in my opinion tend to fall short when depicting histology and macroscopic pathology.

Among the sections rewritten or newly written for this edition are those on antepartum haemorrhage, hypotensive drugs, hypofibrinogenaemia and amniotic embolism.

The fact that the pages of the text-book are printed in double columns may disturb some readers. Each chapter is headed by a quotation from Shakespeare; this I find rather pointless since, in most instances, the bearing the quotation has on what follows is so indirect and tenuous as to be of no value whatsoever.

At the end of the book there are two very useful appendices—the first on the definition of obstetrical terms and the second giving the etymological derivation of terms commonly used in obstetrics.

E.M.S.

REGIONAL ILEITIS

Regional Ileitis. Second revised edition. By Burrill B. Crohn, M.D. and Harry Yarnis, M.D. Pp. x+239. 81 figures. $7.25. New York and London: Grune & Stratton, Inc. 1958.

The 2nd edition of this monograph by the author whose name is eponymous with the disease is a detailed survey of over 600 personal cases seen during the past 25 years. The purpose has been to portray the natural history of the disease, and assess from the information now available the place of medical and surgical treatment.

Possible aetiological factors are thoroughly discussed, and convincing details of cases of abdominal trauma preceding the onset of the disease are presented. The theory of submucosal inflammatory reaction with lymphatic blockage appears to have wide support. There is an outstanding survey of the clinical features, and the importance of fistula formation as the most constant clinical and pathological phenomenon in ileitis is stressed. A separate chapter on the radiographic diagnosis is included.

The importance of this book lies in the vast personal experience of Dr. Crohn. Nearly 10% of patients remain well on conservative treatment. The operation of choice in his hands is a by-pass procedure with ileal exclusion. His reasons against a resection are impressive: a significantly lower mortality, a 29% recurrence rate which is somewhat lower than the recurrence rate after radical excision, and a higher proportion of good results.

The book concludes with a description of acute ileitis, of which two-thirds resolved completely over a long follow-up period. The rarer associated lesions of jejunitis and colitis are described in detail.

This book is a precise and authoritative survey by its chief sponsor of a fascinating disease. The production is good, the text clear and there is a generous presentation of alternative views on surgical treatment; it is essential reading matter for the surgeon.

A.E.K.

CORRESPONDENCE : BRIEWERUBRIEK

MEDICAL SERVICES PLAN

To the Editor: As a result of the Inaugural General Meeting of the Medical Services Plan, held on 27 April and 4 May 1959, I have been asked to forward to you certain alterations which were made to the Draft Constitution and Rules which were published in the *Journal* of 18 April 1959 (**33**, 337).

Constitution

P. 337, 3 (*h*). Insert a comma after the word 'Plan', to read 'the Plan, to assist'.

Insert 'and' between the words 'children' and 'to', second line clause (*h*), to read 'children and to provide . . .'

P. 337, 6. Insert a semi-colon after the word 'him', second line from end of paragraph, to read 'against him; the Board of Directors . . .'.

Delete the words 'have power to', following the word 'shall' in the clause, second line from the end of paragraph, to read 'the Board of Directors shall permit a Participating Member . . .'.

Add an additional sentence at end of paragraph to read '. . . or both. Nothing herein contained shall operate to debar an aggrieved Participating Member from seeking relief on grounds of irregularity from any court of competent jurisdiction'.

P. 337, 6 (*a*). Add '(*a*)' to read as follows: '(*a*) All disciplinary proceedings shall be held *in camera* and at such proceedings there shall be present not less than nine (9) Medical Members of the Board of Directors".

P. 339, 13 (*k*). Delete all words following the word 'executed' in the second and third line of (*k*) and substitute the following, to read 'executed in such manner as the Board may direct'.

P. 339, 14 (*f*). Delete the entire clause and substitute: '(*f*) The Board shall determine the manner in which the receipts, custody and disbursement of funds of the Plan shall be carried out and shall likewise determine the manner in which the purchase and sale of its securities shall be effected; and shall establish a system of bookkeeping and accounting. The Board of Directors shall cause all monies received to be deposited in a Bank and shall prescribe how cheques and other negotiable instruments shall be drawn'.

P. 339, 18. Add the words 'wholly or partly', after the word 'practitioners' in second line of the paragraph, to read 'medical practitioners, wholly or partly in private practice . . .'.

Terms and Conditions of Enrolment

P. 341, I. 8. Delete the words in brackets following the word 'birth' in third and fourth line of clause and add the following, to read 'birth, which is dealt with under III. (*c*), and shall include a Caesarian section and an ectopic pregnancy'.

P. 341, III. (*c*). Change the amount from £25 to £20, second line of paragraph.

In last sentence of paragraph, add the words 'or the use of instruments' after the word 'birth' to read 'A multiple birth or the use of instruments shall not affect . . .'.

P. 341, *Note:* Add the number 1, after the word 'Note', to read 'Note 1'.

P. 341, *Note* 2. Add 'Note 2.' 'The Plan will not make any payment to cover the costs of travelling.'

P. 342, VII. (3). After the word 'Plan', third line, add the following, to read 'the Plan, after proof of services having been rendered, shall pay . . .'.

P. 342, VII. (4). Delete the word 'Participating', in the fourth line of paragraph to read 'attending General Practitioner'.

P. 342, XIII. Add this sentence to paragraph, to read '. . . home. In the discretion of the Board of Directors the nursing care of the patient in a private home may, for the purposes hereof in special circumstances be deemed to be a Hospital Service.'

Terms and Conditions of Participating Doctor's Agreement

P. 343, I. (5). Delete all words following 'South Africa' in line three of paragraph.

P. 344, IV. (4). Insert the word 'that' after the word 'following' in fourth line of paragraph, to read 'the month following that within which . . .'.

P. 344, V. (4). Amend paragraph to read: 'The Plan may of its own initiative appoint a Participating Doctor to consult with any Participating Doctor rendering services to a Subscriber. The Participating Doctor so appointed shall be one selected by the attending Participating Doctor from a panel of Specialists nominated by the Board of Directors. The attending Participating Doctor . . .'.

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